Proceedings Issue

# SCIENCE

17 February 1956

Volume 123, Number 3190

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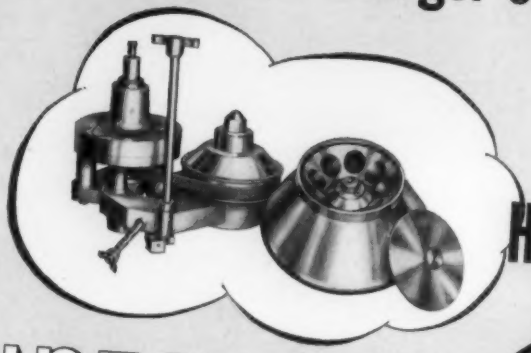

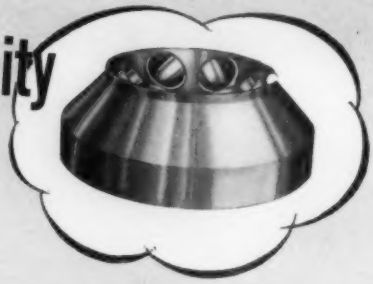

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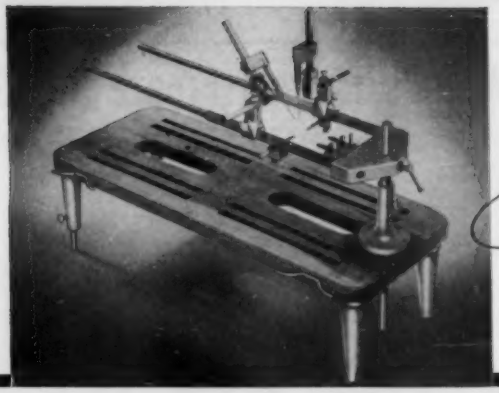

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TOP: *Stereotaxic Instrument mounted on adjustable hardwood stand No. G-109, and showing one application of extension bars with 2 electrode carriers. Rigidity of instrument is an important feature for precision work.*

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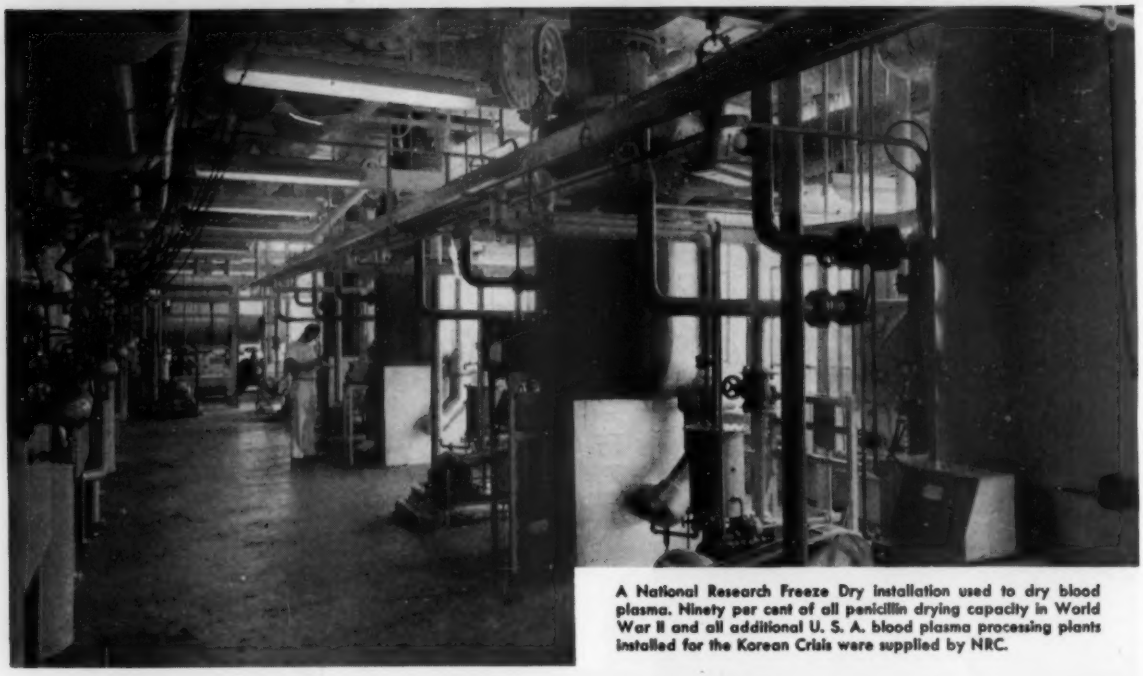
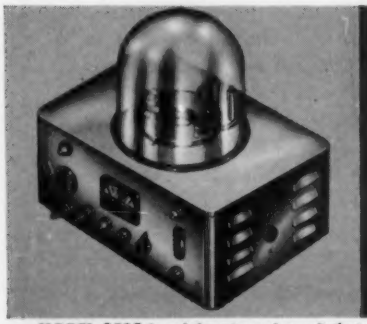
# From the Maker of the World's Largest Freeze Dry Systems

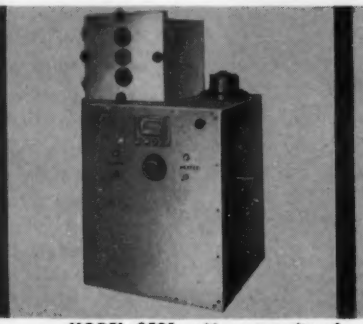


A National Research Freeze Dry installation used to dry blood plasma. Ninety per cent of all penicillin drying capacity in World War II and all additional U. S. A. blood plasma processing plants installed for the Korean Crisis were supplied by NRC.

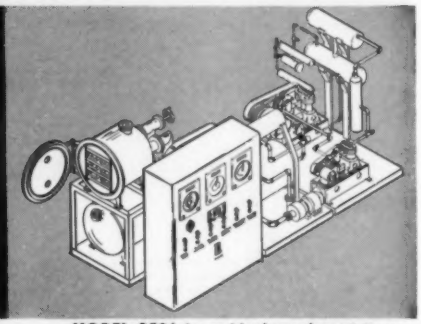
# A New Line of Freeze Dry Units with New Efficiency...Ease of Operation



**MODEL 3505** is a laboratory size unit that eliminates the need for night-shift operators. It runs unattended because there is no cold trap requiring replenishment with dry ice. Self-contained, rugged, and compact, it can be stored out of the way when not in use. Set-up is easy; just plug into 115 volt A.C. circuit.



**MODEL 3501,** with a capacity of 1850 milliliters of water, is used for limited volume production . . . or as a pilot plant to determine optimum drying cycles. Unusually easy to operate, it is a complete unit and like the 3505 does not require water connections.



**MODEL 3506** is an ideal supplement to a large scale freeze dry plant. It automatically records time-temperature curves for determination of optimum drying cycle. A cam cut from the appropriate curve controls the production equipment to reproduce exactly the optimum cycle. Equipped for automatic operation, it can also be used — unattended — for limited scale production.

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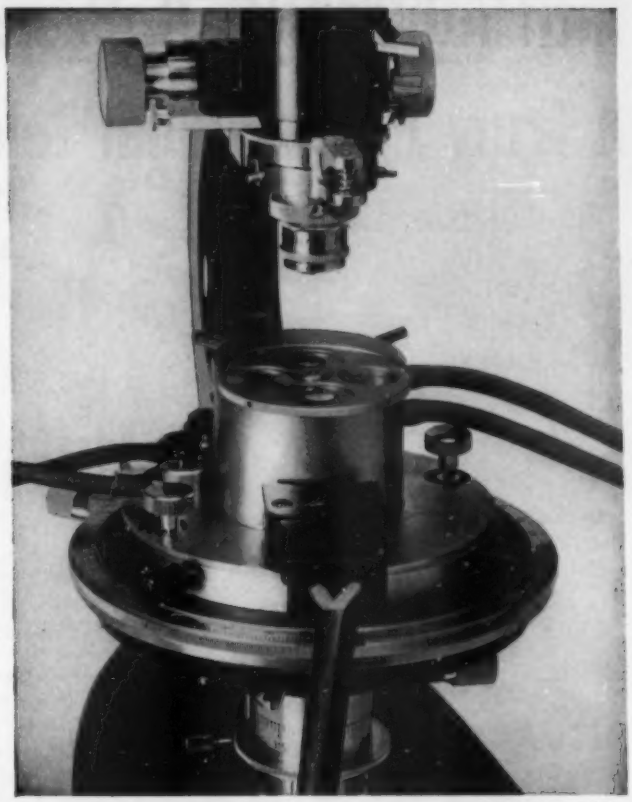

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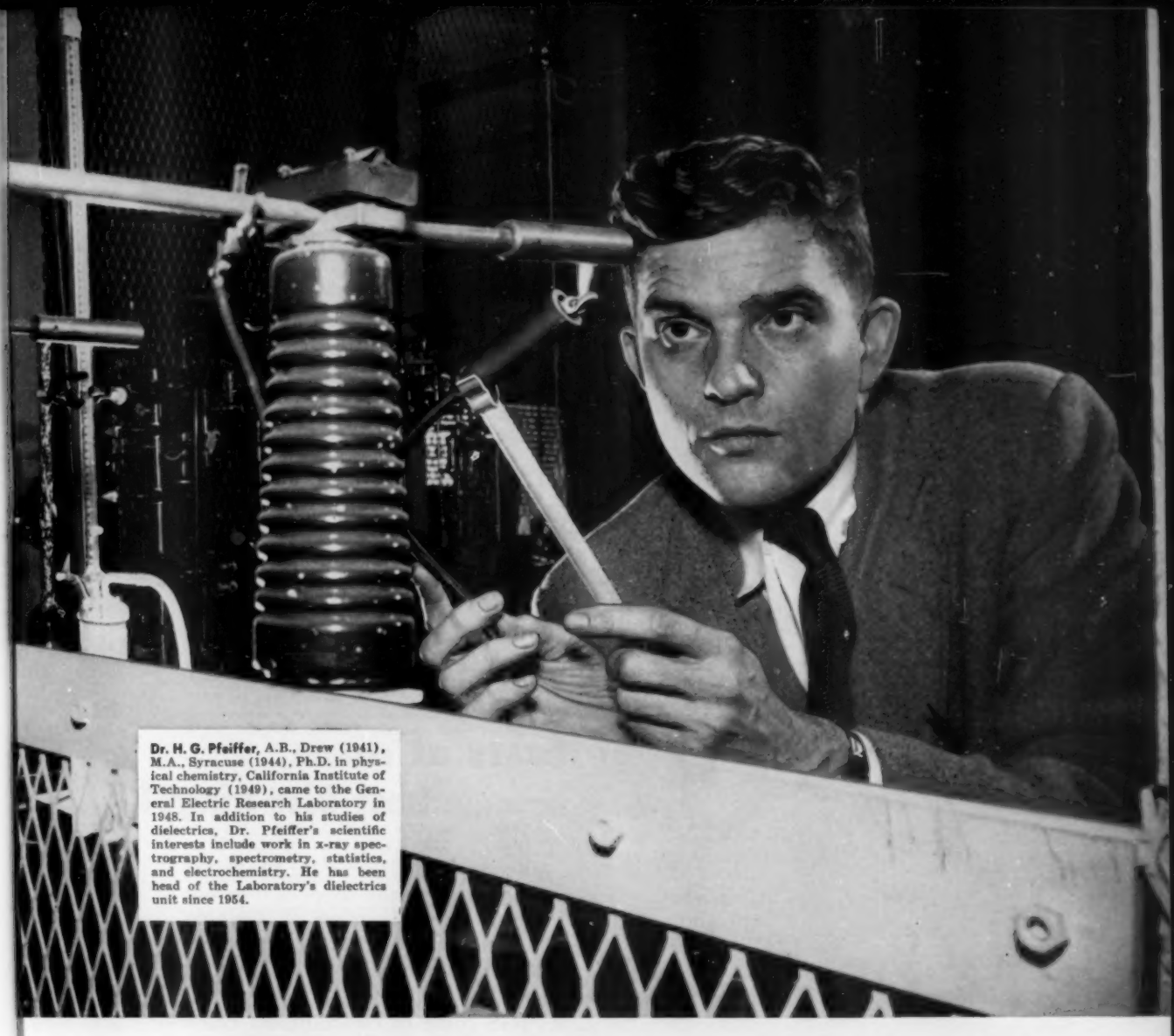

**Dr. H. G. Pfeiffer,** A.B., Drew (1941), M.A., Syracuse (1944), Ph.D. in physical chemistry, California Institute of Technology (1949), came to the General Electric Research Laboratory in 1948. In addition to his studies of dielectrics, Dr. Pfeiffer's scientific interests include work in x-ray spectrography, spectrometry, statistics, and electrochemistry. He has been head of the Laboratory's dielectrics unit since 1954.

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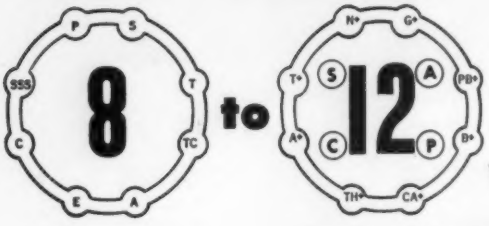


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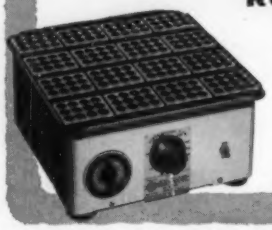

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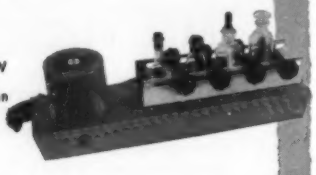

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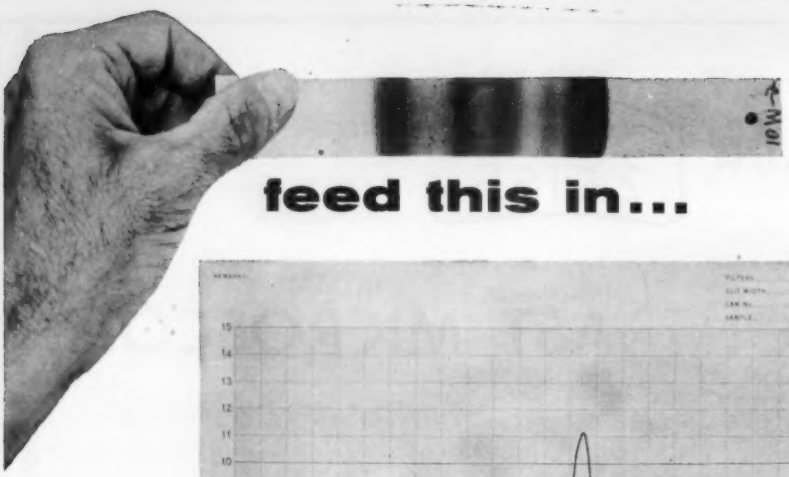

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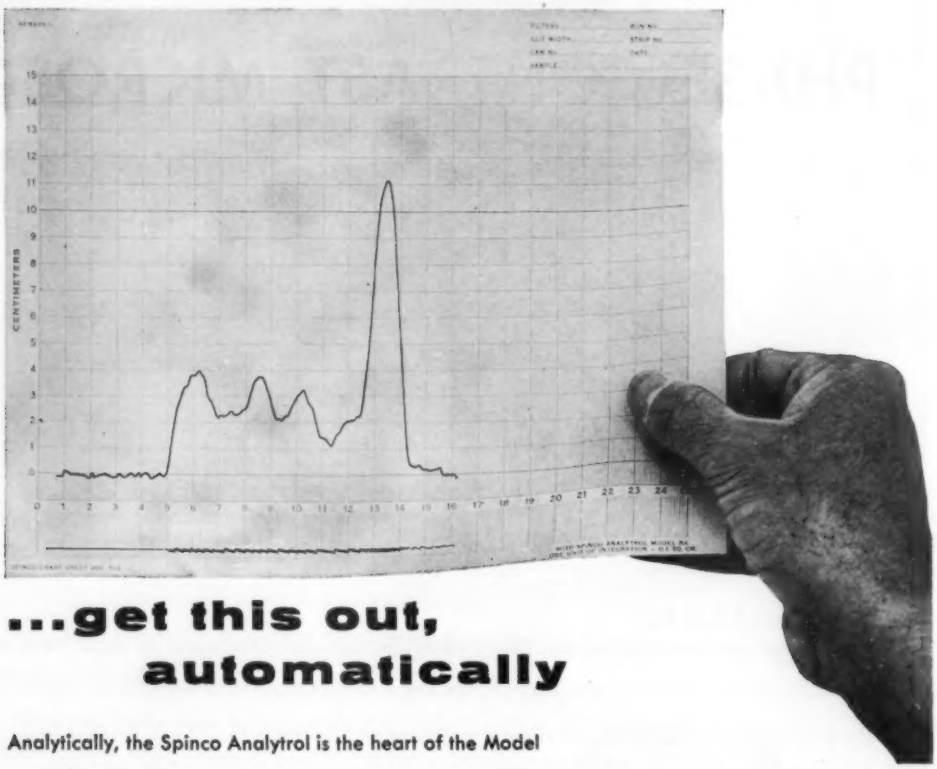


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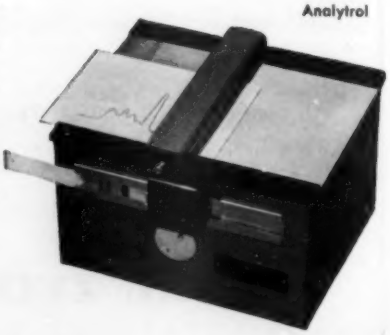

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## Symposia in Utopia

The modern symposium is a far cry from that of the Greeks, whose *symposion* was an after-dinner period of compotation and conversation. The *symposion* has evolved. In our society, one descendant is the cocktail party, which, while it retains the ancient conviviality, has lost some of the original intellectual function. Another is the scientific symposium of our day, which emphasizes the formal exchange of ideas by authorities.

The best of such symposia are timely, definitive, and instructive in summarizing what is known up to the moment when the session opens. Current knowledge is surveyed for the benefit of teachers and research workers, new ideas are introduced, and new lines of research are suggested. A lively interchange of opinion often occurs—to the benefit of all.

If we could arrange an ideal symposium of the modern type, what should we work toward? Some 9 or 10 months before the scheduled date, the program chairman and his advisers should agree on the subject—one of considerable interest and with new developments, and one that would not conflict with any others being arranged elsewhere. The subtopics should be outlined in logical sequence; to develop each, the best man in the field should be selected. Each proposed speaker's specific competence and fluency would outweigh all other considerations.

Immediately thereafter, each invited person should receive an outline of the symposium—topics, subtopics, and chosen speakers—so that he may appreciate its scope and stature. Months before the meeting, full abstracts of the papers should be exchanged among the participants. Such arrangements would lead to a well-integrated program, devoid of both duplication and conspicuous gaps. Scheduled discussion leaders often enhance a symposium. These also should receive the same information in advance, so that they would be prepared to participate effectively in the program.

With this degree of preparation, both the "elder statesmen" and the younger research workers could contribute, more readily than they may at present, to the interplay of thought and the exploration of new approaches to research. A 3-hour session at a symposium like this would not seem long, for the logical progression of ideas and the clash of well-informed opinion would make time pass rapidly.

A symposium so arranged would certainly be worthy of publication. This could be facilitated if more planning were done beforehand. Each symposium paper should be complete with references and footnotes at the time of its presentation. If papers were prepared in this way, the editor (logically, the program chairman) would need to do little more than to write a preface and edit the text.

The principal danger in all this is that, after a symposium so successful in content, organization, and reception, both the arrangers of the program and the speakers will be called upon again, but, in Utopia—why not?

RAYMOND L. TAYLOR, *AAAS*

*Erratum*: In the editorial "The State Department's opportunity in science" [D. W., *Science* 123, 205 (10 Feb. 1956)] the word *misrepresentation* in the last sentence of the third paragraph is a typographical error. The sentence should read: "In sharp contrast with many excellent recommendations of the Hoover Commission, this one seems to us to be completely wrong and probably to arise from a misinterpretation of the attachés' functions."

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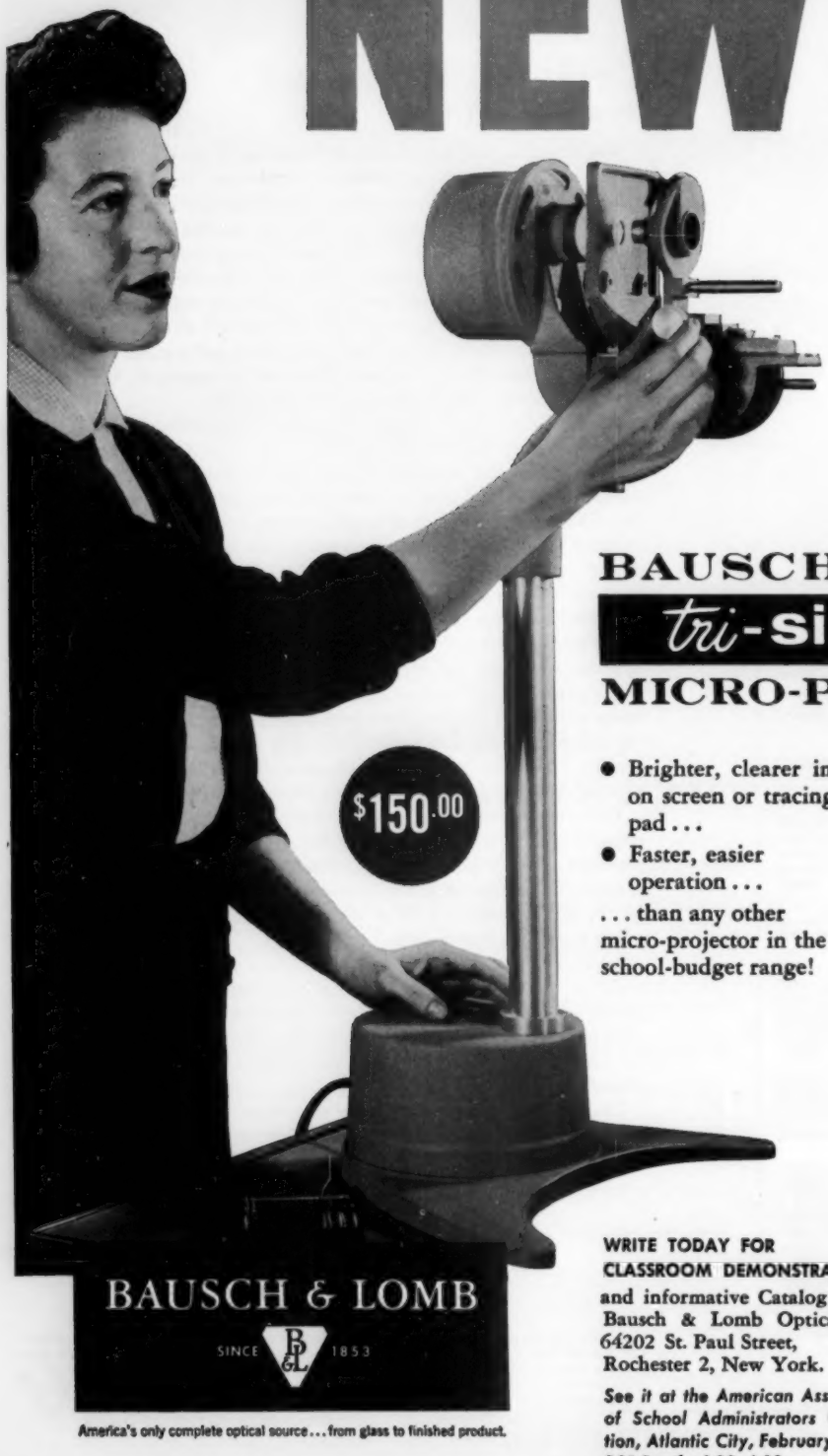


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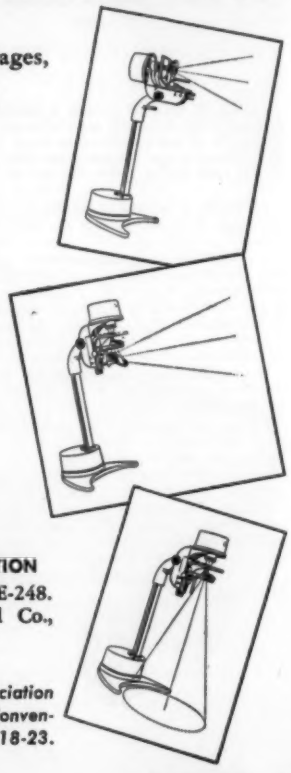

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17 February 1956, Volume 123, Number 3190 SCIENCE

# Modern Structural Chemistry

Linus Pauling

A century ago the structure theory of organic chemistry was developed. Frankland in 1852 suggested that an atom of an element has a definite capacity for combining with atoms of other elements —a definite valence. Six years later Kekulé and Couper, independently, introduced the idea of valence bonds between atoms, including bonds between two carbon atoms, and suggested that carbon is quadrivalent. In 1861 Butlerov, making use for the first time of the term *chemical structure*, stated clearly that the properties of a compound are determined by its molecular structure and reflect the way in which atoms are bonded to one another in the molecules of the compound. The development of the structure theory of organic chemistry then progressed rapidly, and this theory has been of inestimable value in aiding organic chemists to interpret their experimental results and to plan new experiments.

A most important early addition to organic structure theory was made by the first Nobel laureate in chemistry, van't Hoff, who in 1874 recognized that the optical activity of carbon compounds can be explained by the postulate that the four valence bonds of the carbon atom are directed in space toward the corners of a tetrahedron.

The structure theory of inorganic chemistry may be said to have been born only 50 years ago, when Werner, Nobel laureate in chemistry in 1913, found that the chemical composition and properties of complex inorganic substances could be explained by assuming that metal atoms often coordinate about themselves a number of atoms different from their valence, usually four atoms at the corners of either a tetrahedron or a square that is coplanar with the central atom, or six atoms at the corners of an octahedron. His ideas about the geometry of inorganic complexes were completely verified 20 years later through the application of the technique of x-ray diffraction.

The author is professor of chemistry at California Institute of Technology. This article is the lecture that he gave when he was awarded the Nobel prize for chemistry in 1954. It is published here with the permission of the Nobel Foundation.

## The Chemical Bond

After the discovery of the electron many efforts were made to develop an electronic theory of the chemical bond. A great contribution was made in 1916 by Gilbert Newton Lewis, who proposed that the chemical bond, such as the single bond between two carbon atoms or a carbon atom and a hydrogen atom that is represented by a line in the customary structural formula for ethane, consists of a pair of electrons held jointly by the two atoms that are bonded together. Lewis also suggested that atoms tend to assume the electronic configuration of a noble gas, either through the sharing of electrons with other atoms or through electron transfer, and that the eight outermost electrons in an atom with a noble-gas electronic structure are arranged tetrahedrally in pairs about the atom. Applications of the theory and additional contributions to it were made by many chemists, including Irving Langmuir and Nevil Vincent Sidgwick.

After the discovery of quantum mechanics in 1925 it became evident that the quantum-mechanical equations constitute a reliable basis for the theory of molecular structure. It also soon became evident that these equations, such as the Schrödinger wave equation, cannot be solved rigorously for any but the simplest molecules. The development of the theory of molecular structure and the nature of the chemical bond during the past 25 years has been in considerable part empirical—based on the facts of chemistry—but with the interpretation of these facts greatly influenced by quantum-mechanical principles and concepts.

The solution of the wave equation for the hydrogen molecule-ion by Ø. Burrau (*1*) completely clarified the question of the nature of the one-electron bond in this molecule-ion. Two illuminating quantum-mechanical discussions of the shared-electron-pair bond in the hydrogen molecule were then simultaneously published, one by Heitler and London (*2*) and the other by E. U. Condon (*3*). In the approximate solution of the wave equation for the hydrogen molecule by Heitler and London a wave function is used that requires the two electrons to be separated, each being close to one of the two nuclei. The treatment by Condon permits the electrons to be distributed between the two nuclei independently of one another, each occupying a wave function similar to Burrau's function for the hydrogen molecule-ion. Condon's treatment is the prototype of the molecular-orbital treatment that has been extensively applied in the discussion of aromatic and conjugated molecules, and Heitler and London's treatment is the prototype of the valence-bond method. When the effort is made to refine the two treatments they tend to become identical.

These early applications of quantum mechanics to the problem of the nature of the chemical bond made it evident that in general a covalent bond, involving the sharing of a pair of electrons between two atoms, can be formed if two electrons are available (their spins must be opposed in order that the bond be formed) and if each atom has available a stable electronic orbital for occupancy by the electrons.

The equivalence of the four bonds formed by a carbon atom, which had become a part of chemical theory, was not at first easily reconciled with the quantum-mechanical description of the carbon atom as having one $2s$ orbital and three $2p$ orbitals in its outer shell. The solu-

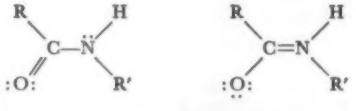
tion to this difficulty was obtained when it was recognized that as a result of the resonance phenomenon of quantum mechanics a tetrahedral arrangement of the four bonds of the carbon atom is achieved (*4*). The carbon atom can be described as having four equivalent tetrahedral bond orbitals, which are hybrids of the *s* and *p* orbitals. Further study of this problem led to the discovery of many sets of hybrid bond orbitals, which could be correlated with bond angles, magnetic moments, and other molecular properties (*5*). In particular, it was found that $sp^3$, $dsp^2$, and $d^2sp^3$ hybrid orbitals correspond, respectively, to the tetrahedral, square planar, and octahedral configurations of inorganic complexes that had been discovered by Werner. Conclusions about the utilization of atomic orbitals in bond formation can be drawn from experimental values of magnetic moments. For example, the theory of the $dsp^2$ square complexes of bipositive nickel, palladium, and platinum requires that these substances be diamagnetic. The square complexes of bipositive palladium and platinum had been recognized by Werner and their structure verified by Dickinson (*6*); but the assignment of the square configuration to the complexes of nickel that are diamagnetic had not been made until the development of the new theory.

Further detailed information about the chemical bond resulted from a consideration of the energy of single bonds in relation to the relative electronegativity of the bonded atoms (*7*). It was found that the elements can be assigned electronegativity values such as to permit the rough prediction of the heats of formation of compounds to which chemical structures involving only single bonds are conventionally assigned, and that many of the properties of substances can be discussed in a simple way with the use of the electronegativity values of the elements.

## Theory of Resonance

The idea that the properties of many organic compounds—especially the aromatic compounds—cannot be simply correlated with a single valence-bond structure but require the assignment of a somewhat more complex electronic structure was developed during the period 1923 to 1926 by a number of chemists, including Lowry, Lapworth, Robinson, and Ingold in England, Lucas in the United States, and Arndt and Eistert in Germany. It was recognized that the properties of aromatic and conjugated molecules can be described by the use of two or more valence-bond structures, as reflected in the names—the theory of mesomerism and the theory of intermediate states—that were proposed for the new chemical theory.

In 1931 Slater, E. Hückel, and others recognized that these theories can be given a quantum-mechanical interpretation: an approximate wave function for a molecule of this sort can be set up as the sum of wave functions representing the hypothetical structures that correspond to the individual valence-bond structures. The molecule can then be described as having a structure that is a hybrid of the individual valence-bond structures, or as resonating among these structures, and the theory itself is now usually called the resonance theory of chemical structure. Very many quantitative calculations—approximate solutions of the wave equation—for aromatic and conjugated molecules have been made, with results that are in general in good agreement with experiment. Perhaps more important than the quantitative calculations is the possibility of prediction by simple chemical arguments. For example, the amide group, an important structural feature of proteins, can be described as resonating between two structures, one with the double bond between the carbon atom and the oxygen atom, and the other with the double bond beween the carbon atom and the nitrogen atom (*8*):




General arguments about the stability of alternative structures indicate that the structure with the double bond between carbon and oxygen should contribute somewhat more to the normal state of the amide group than the other structure; experience with other substances and acquaintance with the results of quantum-mechanical calculations suggests the ratio 60 percent to 40 percent for the respective contributions of these structures. A 40-percent contribution of the structure with the double bond between the carbon atom and the nitrogen atom would confer upon this bond the property of planarity of the group of six atoms; the resistance to deformation from the planar configuration would be expected to be 40 percent as great as it is for a molecule, such as ethylene, that contains a pure double bond, and it can be calculated that rotation of one end by 3 degrees relative to the other end would introduce a strain energy of 100 calories per mole. The estimate of 40-percent double-bond character for the carbon-nitrogen bond is supported by the experimental value of the bond length, 1.32 angstroms, interpreted with the aid of the empirical relation between double-bond character and interatomic distance (*9*). Knowledge of the structure of amides, and also of the amino acids, that was provided by the theory of resonance and verified by extensive careful experimental studies made by R. B. Corey and his coworkers has been of much value in the determination of the structure of proteins.

In the description of the theory of resonance in chemistry there has been a perhaps unnecessarily strong emphasis on its arbitrary character. It is true, of course, that a description of the benzene molecule can be given in quantum-mechanical language without any reference to the two Kekulé structures, in which double bonds and single bonds alternate in the ring. An approximate wave function for the benzene molecule may be formulated by adding together two functions, representing the two Kekulé structures, and adding other terms, to make the wave function approximate the true wave function for the molecule more closely, or it may be constructed without explicit introduction of the wave functions that represent the two Kekulé structures. It might be possible to develop a simple way of discussing the structure of the amide group, for example, that would have permitted chemists to predict its properties, such as planarity; but in fact no simple way of discussing this group other than the way given here, which involves resonance between two alternative valence-bond structures, has been discovered, and it seems likely that the discussion of complex molecules in terms of resonance among two or more valence-bond structures will continue in the future to be useful to chemists, as it has been during the past 20 years.

The convenience and usefulness of the concept of resonance in the discussion of chemical problems are so great as to make the disadvantage of the element of arbitrariness of little significance. Also, it must not be forgotten that the element of arbitrariness occurs in essentially the same way in the simple structure theory of organic chemistry as in the theory of resonance—there is the same use of idealized, hypothetical structural elements. In the resonance discussion of the benzene molecule the two Kekulé structures have to be described as hypothetical: it is not possible to synthesize molecules with one or the other of the two Kekulé structures. In the same way, however, the concept of the carbon-carbon single bond is an idealization. The benzene molecule has its own structure, which cannot be exactly composed of structural elements from other molecules. The propane molecule also has its own

structure, which cannot be composed of structural elements from other molecules—it is not possible to isolate a portion of the propane molecule, involving parts of two carbon atoms and perhaps two electrons in between them, and say that this portion of the propane molecule is the carbon-carbon single bond, identical with a portion of the ethane molecule. The description of the propane molecule as involving carbon-carbon single bonds and carbon-hydrogen single bonds is arbitrary; the concepts themselves are idealizations, in the same way as the concepts of the Kekulé structures that are described as contributing to the normal state of the benzene molecule. Chemists have found that the simple structure theory of organic chemistry and also the resonance theory are valuable, despite their use of idealizations and their arbitrary character.

## Fractional Valence Bonds

Other extensions of the theory of the chemical bond made in recent years involve the concept of fractional bonds. Twenty-five years ago it was discovered that a simple theory of complex crystals with largely ionic structures, such as the silicate minerals, can be developed on the basis of the assumption that each cation or metal atom divides its charge or valence equally among the anions that are coordinated about it (*10*). For example, in a crystal of topaz, $Al_2SiO_4F_2$, each silicon atom is surrounded by a tetrahedron of four oxygen atoms, and each aluminum atom is surrounded by an octahedron of four oxygen atoms and two fluorine atoms. The valence of silicon, 4, is assumed to be divided among four bonds, which then have the bond number 1—they are single bonds. The valence of aluminum, 3, is divided among six bonds, each of which is a half bond. A stable structure results when the atoms are arranged in such a way that each anion, oxygen or fluorine, forms bonds equal to its valence. In topaz each oxygen atom forms one single bond with silicon and two half bonds with aluminum, whereas each fluorine atom forms only two half bonds with aluminum. The distribution of the valences hence then corresponds to the bivalence of oxygen and the univalence of fluorine. It was pointed out by W. L. Bragg that if the metal atoms are idealized as cations ($Si^{++++}$ and $Al^{+++}$) and the oxygen and fluorine atoms as anions ($O^{--}$ and $F^-$), this distribution corresponds to having the shortest possible lines of force between the cations and the anions—the lines of force need to reach only from a cation to an immediately adjacent anion, which forms part of its coordination polyhedron. Occasionally ionic crystals are found in which there are small deviations from this requirement, but only rarely are the deviations larger than one-quarter of a valence unit.

Another application of the concept of fractional valence bonds has been made in the field of metals and alloys. In the usual quantum-mechanical discussion of metals, which was initiated by W. Pauli (*11*) and Sommerfeld (*12*), the assumption was made that only a small number of electrons contribute significantly to the binding together of the metal atoms. For example, it was customary to assume that only one electron, occupying a 4*s* orbital, is significantly involved in the copper-copper bonds in the metal copper. Sixteen years ago an analysis of the magnetic properties of the transition metals was made that indicated that the number of bonding electrons in the transition metals is much larger—of the order of magnitude of six (*13*). Iron, for example, can be described as having six valence electrons, which occupy hybrid $d^2sp^3$ orbitals. The six bonds, corresponding to these six valence electrons, resonate among the 14 positions connecting an iron atom with its 14 nearest neighbors. The bonds to the eight nearest neighbors have bond number approximately 5/6, and those to the six slightly more distant neighbors have bond number 1/6. In gamma iron, where each atom is surrounded by 12 equally distant neighbors, the bonds are half bonds. The concept that the structure of metals and intermetallic compounds can be described in terms of valence bonds that resonate among alternative positions, aided by an extra orbital on most or all of the atoms (the metallic orbital), has been found to be of value in the discussion of the properties of these substances (*14*). The resonating-bond theory of metals is supported especially strongly by the consideration of interatomic distances in metals and intermetallic compounds (*15*).

The iron atom has eight electrons outside the argon shell of 18. Six of these electrons are assumed, in the resonating-valence-bond theory, to be valence electrons, and the remaining two are atomic electrons, occupying 3*d* orbitals, and contributing 2 Bohr magnetons to the magnetic moment of the atom. A theory of the ferromagnetism of iron has recently been developed (*16*) in which, as suggested by Zener (*17*), the interaction producing the Weiss field in the ferromagnetic metal is an interaction of the spin moments of the atomic electrons and uncoupled spins of some of the valence electrons. It has been found possible to use spectroscopic energy values to predict the number of uncoupled valence electrons, and hence the saturation magnetic moment for iron: the calculation leads to 0.26 uncoupled valence electrons per atom and saturation magnetic moment of 2.26 Bohr magnetons, which might be subject to correction by 2 or 3 percent because of the contribution of orbital moment. The experimental value is 2.22. A calculated value of the Curie temperature in rough agreement with experiment is also obtained.

The valence theory of metals and intermetallic compounds is still in a rather unsatisfactory state. It is not yet possible to make predictions about the composition and properties of intermetallic compounds with even a small fraction of the assurance with which they can be made about organic compounds and ordinary inorganic compounds. We may, however, hope that there will be significant progress in the attack on this problem during the next few years.

## Organic Substances

Let us now return to the subject of the structural chemistry of organic substances, especially the complex substances that occur in living organisms, such as proteins. Recent work in this field (*18*) has shown the value of the use of structural arguments that go beyond those of the classical structure theory of organic chemistry. The interatomic distances and bond angles in the polypeptide chains of proteins are precisely known—the bond distances to within about 0.02 angstrom and the bond angles to within about 2 degrees. It is known that the amide groups must retain their planarity; the atoms are expected not to deviate from the planar configuration by more than perhaps 0.05 angstrom. There is rotational freedom about the single bonds connecting the alpha carbon atom with the adjacent amide carbon and nitrogen atoms, but there are restrictions on the configurations of the polypeptide chain that can be achieved by rotations about these bonds: atoms of different parts of the chain must not approach one another so closely as to introduce large steric repulsion, and in general the N—H and O atoms of different amide groups must be so located relative to one another as to permit the formation of hydrogen bonds, with N—H···O distance equal to $2.79 \pm 0.10$ angstrom and with the oxygen atom not far from the N—H axis. These requirements are stringent ones. Their application to a proposed hydrogen-bonded structure of a polypeptide chain cannot in general be made by the simple method of drawing a structural formula; instead, extensive numerical calculations must be carried out, or a model must be constructed. For the more complex structures, such as those that are

now under consideration for the polypeptide chains of collagen and gelatin, the analytic treatment is so complex that it resists successful execution, and only the model method can be used. In order that the principles of modern structural chemistry may be applied with the power that their reliability justifies, molecular models must be constructed with great accuracy. For example, molecular models on the scale 2.5 centimeters = 1 angstrom have to be made with a precision better than 0.01 centimeter.

We may, I believe, anticipate that the chemist of the future who is interested in the structure of proteins, nucleic acids, polysaccharides, and other complex substances with high molecular weight will come to rely on a new structural chemistry, involving precise geometrical relationships among the atoms in the molecules and the rigorous application of the new structural principles, and that great progress will be made, through this technique, in the attack, by chemical methods, on the problems of biology and medicine.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# News of Science

## New Oral Insulinlike Agent

Preliminary observations with a sulfonamide derivative, which was originally synthesized in Germany, indicated it to be orally effective in controlling the hyperglycemia and glycosuria of patients with the adult form of *diabetes mellitus*. Less consistent beneficial effects have been produced in juvenile diabetics from observations to date. Nondiabetic human subjects may experience symptoms of hypoglycemia in association with the fall of blood-sugar levels. This compound is a bacteriostatically inert aryl sulfonylurea, being developed in the United States by the Upjohn Company, Kalamazoo, Mich., under the trade name of Orinase. It has been found to be similarly active in the intact animal but is without effect in depancreatized or alloxan-diabetic animals.

The mechanism of hypoglycemic action of Orinase remains to be clarified. Some observers favor the concept of insulinase inhibitions; others suggest a suppression of glucagon elaboration to account for its "antidiabetic" action. No disturbance of hypatic or renal functions or evidence of direct sensitivity from Orinase have been reported to date. The use of this compound is at present restricted to investigation of its scope and limitations.—E.M.L.

## National Institute of Allergy and Infectious Diseases

An expanded program of research in allergy and infectious diseases has been announced by Leonard A. Scheele, Surgeon General of the U.S. Public Health Service. The program will be administered by the National Microbiological Institute, which is being redesignated the National Institute of Allergy and Infectious Diseases. The renaming of the institute reflects the importance of the new research program on allergies and the close relationship of such research with the study of infectious diseases.

The institute will also support long-term basic studies through grants to research scientists in the universities and medical schools. An increase of $3.3 million will be sought for this program for fiscal year 1957.

A separate national advisory council on allergy and infectious diseases is being established to make recommendations regarding the new grant and training activities. Heretofore, the National Advisory Health Council has advised on grants for infectious disease research as well as on grants for research in other medical and public health fields that are not covered by a specific research institute.

## Assistant Director for STIP

Irvin E. Wallen, associate professor of zoology and chairman of biological science courses at Oklahoma Agricultural and Mechanical College, has been granted a year's leave to serve as assistant director of the AAAS Science Teaching Improvement Program (STIP). He assumed his post in Washington on 25 Jan.

Wallen holds a B.A. and an M.A. degree from Oklahoma A. and M. and a Ph.D. from the University of Michigan. He was a teaching fellow at Michigan before he started his full-time teaching career in 1948 as instructor at Oklahoma A. and M. His research has included water pollution studies, and recently he helped the petroleum refiners in Oklahoma to organize a waste-control council.

Wallen's activities at Oklahoma A. and M. especially qualify him for service on the STIP program. He has served on a number of university committees, particularly those concerned with teacher education and the relationship of the college to secondary schools. In addition, during the past year he has been chairman of the science education section of the Oklahoma Academy of Science. One of his responsibilities in STIP will be to work with state academies.

## U.S. Geological Survey

In its annual report the U.S. Geological Survey states that the previous achievement records in mapping were exceeded in 1955 by the publication of some 2669 new and reprinted topographic maps. This represents an increase of more than 25 percent over the high record established the previous year. The year's production brought to about 17,000 the number of different maps now

available in the national topographic map series.

Cooperative mapping projects are under way in 30 states. A significant accomplishment of the year was the substantial completion of the topographic quadrangle mapping of Kentucky as a cooperative project. This work, initiated in 1949, represents the largest concentration of mapping operations on a federal-state cooperative basis ever accomplished by the Survey and includes over 700 7½-minute maps at the uniform scale of 2000 feet per inch.

Drilling on public lands during the year included the spudding of 1413 wells and the completion of 1352, of which 937 were productive of oil or gas. In all, 21,758 wells, including 12,433 capable of oil or gas production, were under supervision on 30 June 1955. Production was appreciably greater than in 1954, amounting to about 110,595,718 barrels of petroleum; 260,661,003,000 cubic feet of natural gas; and 211,127,968 gallons of gasoline and butane, with royalty returns to the United States of about $39,222,638.

Under the Federal mineral leasing laws the bureau supervised 1813 mining properties and 110,577 oil and gas properties on Federal, Indian, and "acquired" lands. Total valuation of production amounted to approximately $523,753,229. This was an increase of about 8 percent over the preceding record-breaking year, and produced royalties for division among the states, Indian tribes, the Reclamation Fund, and the U.S. Treasury of $53,676,777.

## Atomic Energy Notes

■ A conference to discuss the establishment of an international atomic energy agency will take place in Washington, D.C., on 27 Feb. All the invited countries have agreed to send delegates to the meeting. The participants include Australia, Belgium, Brazil, Britain, Canada, Czechoslovakia, India, France, Portugal, South Africa, and the U.S.S.R. James J. Wadsworth, deputy to the chief United States delegate to the United Nations, is this country's representative. The primary purpose of the meeting will be to consider the text of a draft statute for the new organization, which is to be a special agency under the United Nations.

■ The first cyclotron on the African continent was opened recently by the South African minister of economics. The facility was built by the South African Council of Scientific and Industrial Research at a cost of $280,000.

■ The U.S. Atomic Energy Commission has made public its 19th semiannual report to the Congress.

■ West Germany has started construction of its first plant for production of heavy water. The Farbwerke Chemical Company of Höchst, which is near Frankfurt, has announced that it is building a $1.5 million plant that is expected to be in production in 1957.

## Annual Reviews

Annual Reviews, Inc., nonprofit publishing house in Palo Alto, Calif., has expanded so greatly that construction of a $63,000 headquarters building will begin soon. Since its founding 25 years ago by J. Murray Luck, professor of biochemistry at Stanford University, the organization has been housed in the university's physiology building.

Annual Reviews publishes summaries of all the literature in each of nine different fields. The most recent subject to be included in the series is entomology, the first volume of which has just been completed.

The original market for the reviews was primarily academic, but there has been a growing demand from industry. Annual sales last year were $193,000.

## News Briefs

■ The U.S. Army Medical Nutrition Laboratory, Denver, Colo., in cooperation with the Quartermaster Research and Development Command, Natick, Mass., is conducting a metabolic balance study on a platoon of 26 soldier volunteers at Fort Churchill, Manitoba, Canada. The object is to determine the caloric and nutrient requirements of human subjects who are exposed to cold and great physical exertion for an extended period of time, and also to study the physiological and biochemical changes that occur. The team from the Nutrition Laboratory includes Leo V. Growley, Lester M. Levy, Billy Welch, C. Frank Consolazio, and seven enlisted laboratory technicians.

■ M. S. Thacker, director of the Indian Council of Scientific and Industrial Research, announced in Calcutta at the end of December the establishment of a Scientific Civil Service for India. The new service has been formed in order to develop a group of men of ability for scientific study and research. At the end of the second Five-year Plan the council will have 21 research laboratories; at present it has 16.

■ Evidence that early man may have roasted elephants more than 29,000 years ago on Santa Rosa Island, 30 miles off the coast of California, has been reported by George F. Carter, professor of geography at Johns Hopkins University. The discovery of burned elephant bones in what is believed to be a man-made fire place was made by an expedition to Santa Rosa that included, in addition to Carter, Philip C. Orr, curator of anthropology at the Santa Barbara Museum of Natural History; Carl L. Hubbs, biology professor at the Scripps Institution of Oceanography; and Wallace Broecker of the Lamont Geological Observatory at Columbia University.

## Scientists in the News

T. KEITH GLENNAN has been selected by President Eisenhower for membership on the National Science Board. Glennan, who has been president of the Case Institute of Technology in Cleveland since 1947, is to serve out the unexpired term, ending in May 1958, of Chester I. Barnard, president (retired), Rockefeller Foundation, whose resignation the President has accepted.

NORRIS W. RAKESTRAW, head of the chemistry division of the Scripps Institution of Oceanography, has received the annual $1000 James Flack Norris award of the Northeastern Section of the American Chemical Society. The award, which is for outstanding achievement in the teaching of chemistry, was presented at a dinner on 9 Feb. at Massachusetts Institute of Technology.

H. L. ANTHONY, III, has been appointed director of research at the Mellon Institute and G. A. WEBB the new director of engineering. Both men, who took office on 1 Feb., have held fellowships at the institute.

Anthony, a member of the institute since 1939, is a specialist in metalworking, particularly in pressure vessel technology. He has headed the fellowship on metalworking that is sustained by the Scaife Company of Oakmont, Pa., and since 1947 he has been a member of Scaife's executive committee.

Webb is a chemical engineer for the Koppers Company. He specializes in catalytic operations involving dehydrogenation, chlorination, and polymerization.

EARL W. FLOSDORF, director of research and development for the F. J. Stokes Machine Company, Philadelphia, has just returned from the Territory of Chad in French Equatorial Africa. He was there in connection with a joint project being sponsored by the United States and France to assist the cattle industry. In particular, the purpose of the visit was to instruct in proper lyophilization techniques for the mass production of viral veterinary vaccines.

ROBERT F. FURCHGOTT, associate professor of pharmacology at the Washington University School of Medicine (St. Louis), has been appointed executive officer of the new department of pharmacology at the State University of New York College of Medicine in Brooklyn. He will assume his new post sometime this spring. Previously combined with physiology as a joint department under the administration of Chandler McC. Brooks, pharmacology at the State University College will become an independent department.

FINDLAY E. RUSSELL, formerly physiologist at the Institute of Medical Research, Huntington Memorial Hospital, Pasadena, Calif., has been appointed director of the Laboratory of Neurological Research, College of Medical Evangelists, Los Angeles General County Hospital.

STANLEY P. DODD, who for the past 2 years has been with McKesson and Robbins, Birmingham, Ala., has been appointed technical director of the Chicago Apparatus Company, Chicago, Ill. He will be responsible for the product development, technical information, and technical services of the company.

RICHARD W. DODSON, secretary to the General Advisory Committee of the Atomic Energy Commission, has been awarded a certificate of appreciation. Dodson, who is chairman of the department of chemistry at Brookhaven National laboratory and professor of chemistry at Columbia University, was cited by the AEC for "devoted service of extraordinary quality to the country in his capacity as Secretary to the General Advisory Committee."

WILLIAM C. ADAMSON, head of the Community Guidance Center in Austin, Tex., for the past 4 years, has been named director of the Child Study, Treatment, and Research Center of the Woods Schools, Langhorne, Pa.

CLAY L. PERRY of the U.S. Naval Postgraduate School at Monterey, Calif., has been named head of the Stanford Research Institute program that will use the new SRI-Stanford University joint computer facility. He has been granted a 9-month leave from his duties as supervisor of the computer laboratory and professor of mathematics at the Monterey school.

To be located in the Engineering Research Laboratory on the university campus, the computer will be of the medium-speed, general purpose digital type. The joint computer facility will be directed by John G. Herriot, professor in the department of mathematics.

LOUIS G. DUNN, who joined the Ramo-Wooldridge Corporation in August 1954 to direct missile research activities, has been elected a vice president of the corporation.

The Washington (D.C.) Academy of Sciences has conferred the following annual awards, which are given to scientists under 40 years of age in recognition of distinguished achievements in the biological, engineering, and physical sciences, and to a secondary school teacher for excellence in the teaching of science:

CLIFFORD EVANS and BETTY J. MEGGERS of the Smithsonian Institution, a husband-wife team, were selected to receive jointly a Biological Science award in recognition of their contributions to the prehistory and human ecology of Lowland South America. They were pioneers in archeology in the Amazon area. They lived and worked in the rain forests where no one previously had been willing to work and there uncovered evidence that has necessitated revision of previously held views of native culture in northeastern South America. Their field work has been in Peru, the Lower Amazon, in British Guiana among the Wai Wai Indians, and in coastal Ecuador.

ROBERT TRAUB, formerly chief of the department of entomology of the Walter Reed Army Institute of Research and now commanding officer of the U.S. Army Medical Research Unit in Malaya, was selected for a Biological Science award in recognition of his work on ectoparasites, fleas, and mites. He made contributions during World War II to the control of mite-borne scrub typhus in the Malaya area, and during the Korean War to the control of hemorrhagic fever.

E. ARTHUR BONNEY of the Applied Physics Laboratory of Johns Hopkins University, Silver Spring, Md., was selected for the Engineering Science award for his contributions in the field of supersonic aerodynamics. He has played a role in elucidating the problems of interactions among the wings, body, and tails of supersonic missiles.

TERRELL L. HILL of the Naval Medical Research Institute, Bethesda, Md., was selected for the Physical Science award in recognition of his contributions to physical and biological chemistry. He has made advances in the statistical mechanics of the behavior of assemblies of particles, molecules, and atoms, and in the applications of statistical mechanics to problems of general chemistry.

HELEN N. COOPER of North Bethesda Junior High School, Bethesda, Md., was selected for the Teaching of Science award for her distinction in fostering ability and enriching perspective in mathematics.

EMIL OTT, director of research for the Hercules Powder Company, has been appointed a vice-president of the Food Machinery and Chemical Corporation's Chemical Divisions and director of the firm's Central Chemical Research. Ott will be located in the executive offices of the Chemical Divisions in New York pending completion of the new research center for the Chemical Divisions near Princeton, N.J. The center will concentrate on long-range research projects in organics, polymers, plastics, tracer techniques, high-temperature and high-pressure processes, and other areas of potential interest to the corporation's six chemical divisions.

JONAS E. SALK was awarded a Congressional gold medal on 26 Jan. for his "great achievement in the field of medicine," the development of the poliomyelitis vaccine. The medal was presented by Secretary of Health, Education and Welfare Marion B. Folsom. Last April President Eisenhower gave Salk a personal citation because no gold medal had yet been struck. Later, at the President's request, Congress authorized that the medal be struck by the United States mint and voted $2500 for the purpose.

The Institute of Metals, London, England, has announced the following awards:

1956 Institute of Metals medal in platinum, to GEORGES LEON CHAUDRON, professor at the Sorbonne and director of the Laboratoire de Vitry du Centre National de la Récherche Scientifique, "in recognition of his outstanding contributions to knowledge, particularly in the field of the light metals, which have greatly benefited the metal industries."

1956 Rosenhain medal, to DONALD McLEAN, principal scientific officer, Metallurgy Division, National Physical Laboratory, Teddington, "in recognition of his outstanding contributions to knowledge in the field of physical metallurgy."

1955 W. H. A. Robertson medal and premium of 50 guineas to E. J. THACKWELL of the Northern Aluminium Company, Ltd., Rogerstone, Mon., for a paper on the "Choice and construction of monolithic linings for twin-bath induction furnaces for melting aluminium alloys."

## Recent Deaths

JOHN W. BARNARD, Madison, Wis.; 43; professor of anatomy at Marquette University Medical School; 24 Dec.

BERTHA C. CADY, Atlanta, Ga.; 84; naturalist; former executive secretary

of the coordinating council of natural history activities at the Museum of Natural History; past president of the American Nature Study Society; 26 Jan.

ROBERT CHARR, Philadelphia, Pa; 52; specialist in internal medicine; assistant professor of medicine at Jefferson Medical College; 29 Jan.

HORTENSE P. DRAPER, Hastings-On-Hudson, N.Y.; 82; lecturer on conservation, who had been active in furthering related legislation; 27 Jan.

NATHANIEL FUCHS, Newark, N.J.; 57; research chemist for the General Aniline and Film Corporation, Linden, N.J.; 25 Jan.

FRED W. HOWARD, Burlingame, Calif.; 71; structural engineer; 27 Jan.

R. H. JESSE, Missoula, Mont.; 72; vice president emeritus and professor emeritus of chemistry at Montana State University; 23 Dec.

HENRY SCHRECK, Queens, N.Y.; 75; retired mechanical engineer; 29 Jan.

CHARLES E. TAYLOR, Los Angeles, Calif.; 87; designer and builder of the airplane engine used by the Wright brothers in their Kitty Hawk, N.C. flight; 30 Jan.

JOHN W. TETER, Chicago, Ill.; 48; director of catalysis research for the Sinclair Research Laboratories, Inc.; member of the advisory board of the AAAS Gordon Research Conferences; 26 Jan.

## Education

■ A major expansion of clinic and research facilities has begun in the dental school at the Northwestern University Medical Center, Chicago. Two new clinics, one designed especially for treatment of handicapped children, are under construction and two research laboratories are being extensively remodelled. A third clinic has just been completed.

■ The University of Tampa, with the aid of a $300,000 3-year contract with the United States Government under the Point IV Program, has established an aircraft technical school in San Julian, Cuba. An American teaching staff has been obtained by the university.

■ A plan to increase the supply of highly qualified high-school science teachers by enabling them to increase their annual incomes has been devised by Arthur D. Little, Inc., Cambridge, Mass., in conjunction with the Lexington (Mass.) School Committee. Under the "Lexington Plan," ADL will find two new graduates with bachelor's degrees in chemistry, physics, biology, or mathematics (fields in which the company is interested) who will be given 3-year contracts to fill one high-school science teacher's position in the Lexington High School.

At the end of the contract they will be qualified for full-time teaching, and consequently, will not be hired on a full-time basis by ADL. If the two candidates need education courses to qualify for teaching, the Arthur D. Little Foundation will provide scholarships for such work during the first summer.

One of the pair will teach during the first semester, and the other during the second semester. Each of them will work at ADL in their respective fields for the rest of the calendar year. Since the Lexington school system will pay the two teachers for their work at the usual rate for those with such qualifications and the company will apply its customary salary scale, the total annual income will be considerably above that possible for beginning teachers. At the end of the 3 years, these teachers will have enough training to enable them to work every summer at ADL or some other company while teaching full time, and so they will always be able to earn a higher rate than they could by teaching alone.

Raymond Stevens, senior vice president of ADL, conceived the idea and asked a committee consisting of Sanborn C. Brown of Massachusetts Institute of Technology, James M. Jagger, and Austin W. Fisher, Jr., both of ADL, to implement the plan. This committee worked out details with John Blackhall Smith, Superintendent of Schools in Lexington, and George P. Wadsworth of MIT, chairman of the Lexington School Committee. It is hoped that similar arrangements can be made with other nearby school systems as soon as possible.

■ The University of Michigan's College of Engineering has established what is perhaps the first general program in applied meteorology. There are now five professional meteorologists at the university participating in various phases of teaching and research: Frank R. Bellaire; A. Nelson Dingle; Floyd C. Elder; Gerald C. Gill; and E. Wendell Hewson. The program is centered, for administrative purposes, in the department of civil engineering, Earnest Boyce, chairman, and is under the supervision of E. Wendell Hewson, professor of meteorology.

The program features studies in which weather and climate play an important part. A recent grant by the National Institutes of Health of $325,000 for a 5-year study of atmospheric pollution by aeroallergens brings together in a cooperative effort specialists in medicine, meteorology, botany, ecology, biochemistry, and public health.

Other research is in progress on various phases of meteorology: penetration of particulates into buildings, dynamic wind loading of structures, and industrial air pollution. A large part of the research is sponsored by private industry.

Eleven courses in theoretical and applied meteorology are offered and further courses are planned. The graduate school has established a program of study leading to the degree of master of science in meteorology.

■ Brandeis University has announced the initiation of a graduate program in physics leading to the M.A. and Ph.D. degrees. Fellowships and teaching assistantships are available to qualified students. Inquiries should be addressed to the Chairman of the Graduate School of Arts and Sciences, Brandeis University, Waltham 54, Mass.

## Grants, Fellowships, and Awards

■ The Donner Foundation, Philadelphia, has announced that it will donate 12 Van de Graaff x-ray generators to hospitals and clinics for treatment of deep-seated cancers. The machines, valued at $68,500 each, are 2-million-volt x-ray generators developed and manufactured by High Voltage Engineering Corporation, Cambridge, Mass. Each institution to receive the equipment must provide the necessary physical facilities and operators, and must pay for installation. Recipient hospitals will provide treatment with the machine on a nonprofit basis. The primary goal in the program is to make advanced therapy available to as many cancer patients as possible.

Delivery of the equipment, at the rate of one generator a month, will begin late in 1956. All of the machines should be installed and in use by the end of 1957. Tentative selection of the recipient institutions has already been made; final determination will be announced within 3 months. The determination will be based upon the needs of the various population areas and upon the interest and experience of the radiological groups that would be available in those areas.

■ An annual award of $250 has been established by Henry and Ida Schuman of New York for an original prize essay in the history of science and its cultural influences. This competition is open to undergraduate and graduate students in any American or Canadian college, university, or institute of technology. Papers submitted for the prize competition should be approximately 5000 words in length, exclusive of footnotes, and thoroughly documented. It is hoped that the prize-winning essay will be suitable for publication in *Isis*, the journal of the History of Science Society.

It is the wish of the donors that "history of science and its cultural influences" should be broadly interpreted. The papers—which should in each case

be original contributions to learning—may deal with the ideas and accomplishments of scientists in the past; they may trace the evolution of particular scientific concepts; or they may study the historical influences of one branch of science on another. The phrase "cultural influences" is taken to include studies of the social and historical conditions that have influenced the growth of science, or the effects of scientific developments on society in the realms of philosophy, religion, social thought, art and literature, economic progress, and so forth. Essays dealing with medical subjects are not acceptable, although papers dealing with the relationships between medicine and the natural sciences will be welcomed.

Papers submitted for competition should be sent to the chairman of the prize committee, Prof. Charles C. Gillispie, Department of History, Princeton University, Princeton, N.J. Papers must be received *on or before 1 June.*

## In the Laboratories

■ Nearly 4000 curies of cobalt-60 has been installed at the General Mills Research Laboratories, Minneapolis, Minn., to be used in studies of foods and chemicals. The material was shipped by truck from the Oak Ridge National Laboratory in a 6000-pound lead container.

The only major cobalt source in the area and one of the largest in the country, its radiation energy is equivalent to about 6000 grams of radium. The cobalt will be kept submerged under a shield of 12 feet of water in a 4- by 6-foot well. Material to be irradiated will be placed on the bottom of the well adjacent to the cobalt.

Installation of the material involved lowering the 3-ton lead container through a hatch in the roof of a small building built over the well, and to the bottom of the well. Then, six stainless steel "pencils," ½ inch in diameter and 9 inches long, each containing 56 cobalt disks, were removed from the container and placed in mechanical holders in the well. When it is necessary to remove the water from the well, as for maintenance or repair work, the cobalt pencils may be lowered into a 3-inch stainless steel pipe that extends another 12 feet below the bottom of the well.

■ Assignment of additional development and production work to the Atomic Energy Commission's Mound Laboratory in Miamisburg, Ohio, will require about $1,300,000 in new equipment and plant changes, as well as increased employment. Advance notices will be sent to prospective bidders asking for sealed proposals on the construction work as soon as plans and specifications are available.

Since its establishment in 1948, Mound Laboratory has been operated for the AEC by Monsanto Chemical Company. The laboratory will continue to conduct classified research on production processes in the nuclear field and will undertake development and production in another field.

■ On 1 Feb. Lucius Pitkin, Inc., metallurgical chemists and consultants, New York, took over the operation of the Atomic Energy Commission's domestic uranium ore buying program for the western United States. The 160 persons who have been working on the program remained in their positions but changed employers. The group's responsibilities include the buying, receiving, weighing, sampling and assaying of domestic uranium and vanadium ores and concentrates in all western states.

Ore buying stations are scattered in strategic locations in the radioactive minerals country at Monticello, Marysvale, Moab and White Canyon, Utah; Edgemont, S. Dakota; Globe and Tuba City, Ariz.; Riverton, Wyo.; and Grants, N.M. In addition to operating these stations Pitkin is operating the concentrate sampling plant and assaying laboratory at Grand Junction, Colo.

■ The Atomic Energy Commission's Isotopes Division has been placed under the Division of Civilian Application and has been designated the Isotopes Extension. The Isotopes Extension will remain at Oak Ridge, Tenn., and Paul C. Aebersold will continue as director.

## Miscellaneous

■ Papers and abstracts of the conference for management on "The place of the atom in your business," which was sponsored by the Cleveland Engineering Society in December in conjunction with the Nuclear Congress, are now available from the society in the form of a special issue of *Cleveland Engineering*. At the conference eight authorities considered how far and in what direction industry should move in the atomic field.

The speakers were Lewis L. Strauss, Clinton P. Anderson, Charles Robbins, Eugene Zuckert, L. R. Zumwalt, Richard S. Morse, A. W. Meyer, and O. B. Falls, Jr. Copies of the special issue may be ordered from the Cleveland Engineering Society, 2136 E. 19 St., Cleveland 15, Ohio, and will be available in any quantity at $1 a copy.

■ The Air Force Armament Center at Eglin Air Force Base is at present expanding and there is urgent need for physicists, mechanical engineers, ballistic experts, and, especially, electronic engineers. The center has recently been given the responsibility for the development of aerial munitions, including guns, bombs, rockets, fuzes, guided missile warheads, and related equipment, exclusive of nuclear weapons.

The positions that are available are primarily for those qualified for Civil Service grades between and including GS-5 and GS-14. Applicants chosen in these grades may expect to receive from $3,670 to $10,320 annually. Interested persons should send a standard Federal employment Form 57 to the Civilian Personnel Office, 3201st Air Base Wing, Eglin Air Force Base, Fla.

■ The Microcard Foundation at the University of Wisconsin has announced the publication on microcards of the unclassified reports of the U.S. Atomic Energy Commission from 1947 through 1954. The AEC microcard reports cover nearly 10,000 cards—approximately half a million pages of print. The unclassified reports of AEC for 1955 are now being prepared for card publication. It is expected that they will be available by spring.

■ The Eastern Psychiatric Research Association is a newly organized association of psychiatrists chartered in New York State. The protocol of this new organization's aims and purposes includes the following: "To initiate, encourage and foster research in psychiatry and related fields of medicine; . . . to stimulate scientific study and research into the nature and development of human behavior; to organize and coordinate public and private research and efforts in the application of sound principles of phychiatric knowledge; . . . to encourage the exchange of scientific knowledge and information in all fields of medicine and especially in the field of psychiatry and mental hygiene."

The first president is David Impastato of New York; the vice president is Leo Alexander of Boston; and Theodore R. Robie, of East Orange, N.J., is secretary-treasurer. The association will hold four meetings per year, including the annual meeting in October. At that meeting, an incentive prize will be awarded for the presentation of the best scientific report. Official transactions will be published in *Diseases of the Nervous System.*

■ The Upjohn Company, Kalamazoo, Mich., has introduced *SCOPE Weekly*, a new weekly newspaper for physicians. Printed by offset process in tabloid-size format, *SCOPE* carries medical news, feature articles, and illustrations. It presents reports on medical meetings, research laboratories, and medical publishing.

# AAAS Constitution and Bylaws

## Constitution

### Article I. Purpose

*Section 1.* The American Association for the Advancement of Science was incorporated by an act of the General Court of the Commonwealth of Massachusetts in 1874. The Association is a nonprofit scientific and educational body.

*Section 2.* The objects of the American Association for the Advancement of Science are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

### Article II. Membership

*Section 1.* The membership of the Association shall consist of Members and Fellows. Individuals in either of these groups may become life members, emeritus members, and sustaining members in accordance with the provisions of Section 5 of this Article and with such relevant rules as the Board of Directors shall have prescribed.

*Section 2. Members.* Any person, institution, or organization may be admitted to the grade of Member. Each Member shall have such rights and privileges and shall pay such annual dues and fees as the Council shall have prescribed.

*Section 3. Fellows.* Any individual member who shall have made a meritorious contribution to science may become a Fellow of the Association under such procedures as the Board of Directors shall have prescribed.

*Section 4.* (*a*) *Life Members.* Any person making the Association a life-membership contribution of such amount as the Board of Directors shall have prescribed may be admitted to life membership. Each Life Member shall be exempt from the payment of annual dues and shall have all the privileges of an annual member throughout his life.

(*b*) *Emeritus members.* Any individual annual member (a member other than a life member or a sustaining member) may be admitted to emeritus membership under such conditions as the Board of Directors shall have prescribed. Each Emeritus Member shall be exempt from the payment of annual dues and shall have all the privileges of an annual member throughout his life.

(*c*) *Sustaining Members.* Any person, institution or organization making to the Trust Funds of the Association a sustaining membership contribution of such amount as the Board of Directors shall have prescribed shall be the founder of a Sustaining Membership which shall bear a suitable name, and the fund for which shall be maintained in perpetuity as a trust. Each incumbent of a sustaining membership shall have all the privileges of a life member. The first incumbent of a sustaining membership may be either the founder himself, if an individual, or a person named by him, as the founder may choose. On the death or resignation of an incumbent, the Board of Directors may name another person to hold the membership throughout life.

### Article III. Officers

*Section 1.* The officers of the Association shall be (a) general officers elected from among the Fellows by ballot of the Council, and (b) administrative officers elected by the Board of Directors as prescribed in Section 3 of this Article.

*Section 2. General Officers.* The general officers of the Association shall be the elected members of the Board of Directors, a president-elect, a president, a retiring president, and a vice president for each section. The term of office of the president-elect and of the vice presidents shall be one year and shall begin on the January 15 following their election. At the close of the one-year term of the president-elect he shall become president, and at the close of the one-year term of the president he shall become retiring president. In the event of a vacancy in the office of the president, the president-elect shall become president. In the event of a vacancy in the office of president-elect, the Board of Directors shall make a pro tempore appointment to hold until the vacancy shall have been filled by ballot of the Council. In the event of a vacancy in the office of vice president, the Board of Directors shall fill the vacancy by appointment.

*Section 3. Administrative Officers.* The administrative officers shall be an executive officer and such other staff members as the Board of Directors may designate and approve, a treasurer, and a secretary for each section. The executive officer, the treasurer, and their designated assistants shall be elected by the Board of Directors. The secretaries of the sections shall be nominated from among the Fellows by the respective section committees and elected by the Board of Directors. The terms of office of each administrative officer shall be determined by the Board of Directors. The Board of Directors shall fill vacancies in the administrative offices.

*Section 4.* The duties of the officers shall be customary to those of the office and as further defined in the bylaws.

### Article IV. Council

*Section 1.* The Council shall perform duties prescribed in the constitution and bylaws and shall act as an advisory body in matters pertaining to the general policies of the Association.

*Section 2.* The Council shall consist of (*a*) the president-elect, the president, the retiring president, the vice presidents, the secretaries of the sections, the executive officer, the treasurer, and the eight (8) elected members of the Board of Directors; (*b*) one Fellow elected by each regional division of the Association; and (*c*) the representatives of affiliated organizations as provided in Article VIII of this constitution. Each Council member shall serve until his successor shall have taken office. Each Council member shall have one vote. The president shall be chairman of the Council; if the president is unable to serve as chairman at any session, the president-elect shall serve in his stead; if neither is able to serve, the Council members in attendance shall elect a chairman for that session. Thirty (30) members of the Council shall constitute a quorum for the transaction of business.

*Section 3.* The Council shall meet during the annual meeting of the Association and at other times on the call of the president or upon the written request of thirty (30) members of the Council addressed to the executive officer.

### Article V. Committees

*Section 1.* The Board of Directors is the legal representative of the Association and as such shall have, hold, and administer all the property, funds, and affairs of the Association.

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The Constitution and Bylaws of the American Association for the Advancement of Science are being published at this time because of the numerous changes that were made by the Council at its meeting on 27 December 1955.

*Section 2.* The Board of Directors shall consist of eleven (11) voting members, as follows: the president-elect, the president, the retiring president and eight (8) Fellows elected by the Council, two each year, for a term of four years. The executive officer and the treasurer shall be ex officio members of the Board of Directors without vote. At any election of members of the Board of Directors not more than one Fellow serving his fourth consecutive year as an elected member may be reelected. In the event of a vacancy in the office of an elected member of the Board of Directors, his successor for the remainder of the year shall be elected from among the Fellows by the Board of Directors and, for the remainder of the unexpired term, his successor shall be elected by the Council at the next annual election. Six (6) voting members of the Board of Directors shall constitute a quorum for the transaction of business. The retiring president of the Association shall be chairman of the Board of Directors. If he is unable to serve at any session of the Board, the Board members in attendance shall elect a chairman for that session.

*Section 3.* The Board of Directors shall hold four (4) meetings a year, one of which will be at the annual meeting. The Board of Directors shall also meet at the call of the chairman.

*Section 4.* The Board of Directors shall appoint such committees as may be necessary to aid in the management of the Association. The duties of standing committees shall be stated in the bylaws.

*Section 5.* The term of office of each of the eight (8) regularly elected members of the Board of Directors shall begin on January 15 following his election, and each shall serve until his successor shall have signified in writing his acceptance of election.

### Article VI. Sections

*Section 1.* The Association shall be organized in sections in accordance with the fields of interest of its members, as determined by the Council. Each member of the Association may designate the section in which he wishes to be enrolled and may designate an additional section in which he is interested.

*Section 2.* The vice president for a section shall be ex officio chairman of that section.

*Section 3.* The affairs of each section shall be managed by a section committee of (*a*) the chairman and secretary of the section; (*b*) members of the Council who represent societies affiliated with the section; and (*c*) four (4) Fellows, one elected each year by the section committee for a term of four (4) years. If an elected member of a section committee shall have resigned or died, his successor for the remainder of the unexpired term shall be elected from among the Fellows by the section committee. One third of the members of the section committee shall constitute a quorum for the transaction of business.

*Section 4.* The section committee of each section shall promote the work of the Association in its own field and may organize subcommittees for that purpose. It shall arrange such section programs as it shall deem desirable for meetings of the Association, either separately or in cooperation with other sections of the Association or with independent societies. With the approval of the Board of Directors, a section committee may arrange section meetings to be held at places and times other than those of Association meetings.

### Article VII. Regional Divisions

*Section 1.* Regional divisions and local branches of the Association may be authorized by vote of the Council, for the purpose of promoting the work of the Association in their respective territories.

*Section 2.* Each regional division or local branch shall elect its officers for such terms as it shall prescribe and shall hold its meetings and conduct its affairs as it shall deem desirable, subject to the relevant provisions of this constitution and of the bylaws of the Association, and to such special provisions as the Board of Directors of the Association shall have established.

### Article VIII. Affiliates and Associates

*Section 1.* To facilitate cooperation between the Association and other organizations, and among the latter, the Council may, on recommendation of the Board of Directors, elect an organization to be an official affiliate.

*Section 2.* Each organization thus designated an affiliate shall be entitled to name one Fellow of the Association to represent it on the Council; if an affiliate other than an Academy of Science has more than 100 members who are Fellows of the Association, it shall be entitled to name an additional Fellow to represent it on the Council.

*Section 3.* On recommendation of the Board of Directors, the Council may elect an organization to be an official associate. Associated organizations shall have the same rights and privileges as affiliated organizations except for representation on the Council.

*Section 4.* Organizations whose activities are planned and directed in close association with those of the American Association for the Advancement of Science may, on recommendation by the Board of Directors and approval by the Council, be designated participating organizations. Such organizations shall be represented on the Council as determined by the Board of Directors and Council.

### Article IX. Meetings

*Section 1.* The Association shall hold an annual meeting at such time and place each year as the Board of Directors shall have determined. Other meetings of the Association or its sections may be authorized by the Board of Directors.

### Article X. Publications

*Section 1.* The publications of the Association shall be issued in such manner as the Board of Directors may direct.

### Article XI. Funds

*Section 1.* Funds of the Association shall be classified as Current Funds, Investment Funds, and Endowment, Trust, and Gift Funds.

(a) *Current Funds* shall include all dues of annual members, all receipts from publications, and all other funds received in the continuing operations of the Association.

(b) *Investment Funds* shall include all gifts and bequests received without special restriction concerning the use to be made of principal and income, and such other funds as may be designated by the Board of Directors as investment funds.

(c) *Endowment, Trust, and Gift Funds* shall consist of all life-membership contributions, all sustaining-membership contributions, all funds appropriated by the Board of Directors for establishing special life memberships, all gifts and bequests accepted with specific restrictions prohibiting their allotment to either Current Funds or Investment Funds, and such other funds as may be designated by the Board of Directors.

*Section 2.* The deposit, investment, and disbursement of all funds shall be subject to the direction of the Board of Directors.

### Article XII. Procedure

*Section 1.* Roberts' rules of order, except when inconsistent with the Constitution and Bylaws of the Association, shall govern the meetings of the Council.

### Article XIII. Amendments

*Section 1.* Amendments to this constitution may be proposed by the Board of Directors, by the Council, or by petition signed by thirty (30) members of the Council. Proposed amendments shall be published officially in substance at least one month prior to an annual meeting of the Association. A proposed amendment

that is approved by the Board of Directors shall require for its adoption a favorable vote of two-thirds of the Council members present in a Council session of that meeting. A proposed amendment that is not approved by the Board of Directors may, by majority vote of the Council members present in a Council session of that meeting, be placed on the agenda for a session of the Council at a subsequent annual meeting, and shall require for its adoption a favorable vote of two-thirds of the Council members present in a Council session of such subsequent annual meeting. Ratified amendments shall be effective upon adoption and shall be published promptly.

## Bylaws

### Article I. Purpose

*Section 1.* The objects of the Association shall be accomplished by conducting meetings and conferences of those interested in science, its various branches, and education, producing and distributing publications, administering gifts and bequests as prescribed by the donors thereof, supporting research, making awards to recognize accomplishments in science, assisting affiliated and associated organizations, cooperating with other organizations in the advancement of science, and engaging in such other activities as shall have been authorized by the Board of Directors.

### Article II. Membership

*Section 1.* Members who have paid dues for fifty years may be excused from further payments and still retain all the privileges of membership.

*Section 2.* Members may be elected by the Board of Directors to be Fellows of the Association and Fellows so elected shall remain Fellows only so long as they retain membership. If a Fellow discontinues his membership and subsequently rejoins the Association, he shall automatically again become a Fellow from the time of rejoining, without another election. Members are eligible to nomination for fellowship if they have contributed to the advancement of science either by the publication of original research or in other significant manner. Nominations for election to fellowship may be made by any three Fellows or by the executive officer or by the section committee in whose field the nominee's scientific work mainly lies.

*Section 3.* A Member may be dropped from membership for conduct which in any way tends to injure the Association or to affect adversely its reputation or which is contrary to, or destructive of, its objects. Charges of injurious conduct shall not be entertained against a Member unless the precise nature of the charges be submitted in writing to the president of the Association by not fewer than two Members. Upon receipt of such charges, the president shall refer them to the Executive Committee, which shall have the power to determine whether the charges shall be dropped, whether the accused shall be given an opportunity to resign, or whether the charges shall be referred to the Board of Directors for review and for final disposition. Whenever charges are referred to the Board of Directors, no person shall be dropped from membership except after opportunity to examine the evidence and to be heard and then only by a three-fourths vote of those members of the Board of Directors present and voting at a regular or a special meeting.

### Article III. Officers

*Section 1.* The executive officer shall serve as secretary to the Council and to the Board of Directors; he shall be in charge of the Association's offices and shall manage the affairs of the Association in accordance with procedures determined by the Board of Directors. He shall be an ex officio member of all standing committees.

*Section 2.* The treasurer shall perform the usual duties and those assigned in the bylaws.

*Section 3.* Reports of the executive officer and the treasurer shall be made in the manner prescribed by the Board of Directors.

### Article IV

(There is no Article IV in the Bylaws, but the number is inserted here in order to preserve the parallelism between Articles in the Constitution and corresponding Articles in the Bylaws.)

### Article V. Committees

*Section 1.* The committees shall be standing, as provided in the bylaws, or special, as the Board of Directors approves. All standing committees shall report annually in writing to the Board of Directors. The chairmen of committees shall be designated by the Board of Directors.

*Section 2.* During the interim between meetings of the Board of Directors, an Executive Committee consisting of the retiring president, the president, three other members of the Board of Directors elected by the Board of Directors, and the executive officer, ex officio, shall act on behalf of the Board of Directors. All actions taken by the Executive Committee shall be submitted for review and action at the next following meeting of the Board of Directors.

*Section 3.* The Investment and Finance Committee shall advise the Board of Directors regarding purchases and sales of securities for the Association, shall make recommendations to the Board of Directors on financial questions, and shall have the authority to buy or sell securities under such limitations as the Board of Directors may set. The Investment and Finance Committee shall consist of the treasurer, the executive officer, and five (5) members appointed by the Board of Directors. Each appointed member shall serve a term of five (5) years, the term of one member to expire on January 14 of each year. Each shall serve until his successor shall have signified in writing his acceptance of election.

*Section 4.* The Committee on Affiliation and Association shall review applications for affiliation or association with the Association and make recommendations thereon to the Board of Directors. The committee shall consist of five (5) members appointed by the Board of Directors. Each member shall serve a term of five (5) years, the term of one member to expire on January 14 of each year. Each shall serve until his successor shall have signified in writing his acceptance of election.

*Section 5.* The Publications Committee shall give continuing scrutiny to the publications of the Association and the policies pertaining thereto and shall make recommendations thereon to the Board of Directors. The committee shall consist of five (5) members appointed by the Board of Directors. Each member shall serve a term of five (5) years, the term of one member to expire on January 14 of each year. Each shall serve until his successor shall have signified in writing his acceptance of election.

### Article VI

(There is no Article VI in the Bylaws, but the number is inserted here in order to preserve the parallelism between Articles in the Constitution and corresponding Articles in the Bylaws.)

### Article VII. Regional Divisions

*Section 1.* Regional divisions authorized by the Council have full control of their meetings, of their affiliations with other scientific organizations, and of their own activities to promote the advancement of science in their respective territories.

*Section 2.* The Pacific Division (organized in 1915) includes members of the Association resident in British Columbia, Washington, Oregon, California, Idaho, Nevada, Utah, Montana west of the Continental Divide, and the Hawaiian Islands.

*Section 3.* The Southwestern and Rocky Mountain Division (organized in

1920) includes members of the Association resident in Arizona, New Mexico, Colorado, Wyoming, Montana east of the Continental Divide, Sonora, Chihuahua, and Texas west of the 100th meridian.

*Section 4.* The Alaska Division (organized in 1951) includes members of the Association resident in Alaska and others who meet such requirements as may be established by the Division and approved by the Board of Directors.

*Section 5.* Each division shall receive for its expenses an annual allowance not to exceed one dollar for each of its members who is an Association member in good standing, or three hundred dollars ($300) whichever is larger, and shall make an annual report to the Board of Directors covering its activities and its financial situation.

### Article VIII. Affiliates and Associates

*Section 1.* The names of affiliated and associated organizations shall be published from time to time as directed by the Board of Directors.

*Section 2.* Affiliated academies of science shall receive for research an annual allowance of fifty cents for each of their members who is also a member in good standing of the Association. The minimum annual allowance shall be fifty dollars. If any academy fails to utilize the research funds made available to it in any one year, these funds shall revert to the Association's treasury on December 31 of the second calendar year following the year in which the allowance was computed.

### Article IX. Meetings

*Section 1.* The programs and arrangements for the Association meetings shall be under the general direction of the Board of Directors.

### Article X. Publications

*Section 1.* The publications of the Association shall be (*a*) SCIENCE, (*b*) THE SCIENTIFIC MONTHLY, (*c*) *Proceedings,* and (*d*) such other special publications as the Board of Directors may direct.

*Section 2.* The Association shall not be responsible for statements or opinions advanced in papers or in discussions at meetings of the Association or its sections, divisions, or branches, or printed in its publications, nor for statements by any of its general or administrative officers except those authorized by the Board of Directors or reflecting the duly established policies of the Association.

### Article XI. Funds

*Section 1.* All funds shall be paid into the business office of the executive officer, where they shall be entered in the books of the Association, and deposited in a bank designated by the Board of Directors. The treasurer shall be the custodian of all Investment Funds, Endowment, Trust, and Gift Funds, and such other funds as may be placed in his charge by the Board of Directors. The executive officer shall be the custodian of the current funds.

*Section 2.* All bills against members and others shall be made and collected by the business office of the executive officer.

*Section 3.* All expenditures shall be made in accordance with the budget of appropriations as adopted by the Board of Directors.

*Section 4.* All payments shall be made by the business office upon competent certification as to their correctness and proper authorization.

*Section 5.* Checks against the accounts of the Association will bear two signatures, from a list of individuals determined by the Board of Directors.

*Section 6.* The securities of the Association may be bought, sold, or exchanged only upon the written order of two of the following: The chairman of the Investment and Finance Committee, the vice-chairman of the Investment and Finance Committee, the treasurer, and the executive officer.

*Section 7.* The business office of the executive officer shall keep proper accounts of all financial transactions of the Association.

*Section 8.* The accounts of the Association shall be audited and approved annually by a certified public accountant selected by the Board of Directors.

*Section 9.* The executive officer shall have the authority to enter into contracts for the Association, but contract authorizations must be within the budget authorizations made by the Board of Directors.

*Section 10.* The policies of a participating organization may be reviewed at any time, with official representation of the participating organization present, by the Board of Directors which may make recommendations to the participating organization.

### Article XII

(There is no Article XII in the Bylaws, but the number is inserted here in order to preserve the parallelism between Articles in the Constitution and corresponding Articles in the Bylaws.)

### Article XIII. Amendments

*Section 1.* The bylaws may be amended by majority vote of the Board of Directors, provided notification of the proposed amendment has been mailed to each member of the Board at least twenty (20) days prior to the meeting.

# L. H. Snyder, President Elect

C. P. Oliver

For a period of years after 1920, most geneticists in this country showed very little interest in human genetics. Most genetical research was carried on with experimental organisms. Occasionally a geneticist discovered an interesting history of a familial pathological trait. He could do very little with the information, though, other than possibly publish it as a single case. Even if the investigator found enough similar histories in the literature to use in determining the mechanism of inheritance, he could hardly expect to make comparative studies of racial and subpopulation groups. Human genetics seemed to have little to interest geneticists. Special methods were needed for analyzing human genetical data, and they were yet to be developed. The general public misunderstood the purpose and significance of studies in human genetics. Many believed that human genetics was merely another term for sterilization or controlled breeding. One can readily understand why geneticists preferred to work with experimental forms.

The president elect of the American

Dr. Oliver is chairman of the department of zoology at the University of Texas, Austin.

President and president elect of the AAAS: (left) Paul B. Sears, Yale University; (right) Laurence H. Snyder, University of Oklahoma.

Association for the Advancement of Science, Laurence H. Snyder, dedicated himself to the study of human genetics early in his scientific career. He recognized the potential value of such study, particularly by applying the information to gain better understanding of population problems. Most of Snyder's research has been devoted to human genetics. Approximately 90 percent of his extensive bibliography are papers on the genetics of man.

Snyder collected familial records of pathological traits but placed greater emphasis on studies of nonpathological traits, such as blood groups and PTC taste deficiency. As information became available, he applied the findings to medicolegal problems and used them in studies of racial relationships. New methods for more accurate determination of the mechanism of inheritance by analyzing mass data were developed. By accepting many invitations to lecture, Snyder presented his opinions about human genetics to nongeneticists and corrected wrong impressions that many had about the subject. As a consequence of Snyder's efforts, human genetics has become an active field of research in this country. Several research centers have been opened to study the genetics and variability of man. People in increasing numbers ask physicians and geneticists to help with familial genetical problems. A number of counseling centers have been organized. Medical schools have begun to consider adding medical genetics to the curriculum. In 1948 interest in human genetics had developed sufficiently that a group organized the American Society of Human Genetics.

Snyder was born in Kingston, N.Y., 23 July 1901. He took the bachelor of science degree in 1922 at Rutgers University, and the master of science degree at Harvard University in 1924. In 1926 Harvard awarded him the degree of doctor of science. Rutgers granted him an honorary doctor of science in 1947.

In 1924 Snyder accepted an appointment with North Carolina State College. In that same year his first published articles on human genetics appeared. Two of these were on the inheritance of blood groups, the first of a long series of papers dealing with the ABO, MN, and Rh blood types. Snyder's interest in the blood groups was broader than mere knowledge about their inheritance. In 1925 and 1926 he published papers on the use of blood groups in studies of racial relationships, in tests for paternity, and in linkage tests. A book, *Blood Grouping in Relation to Clinical and Legal Medicine*, published in 1929, summarized the data available up to that time.

Snyder accepted an appointment as associate professor with Ohio State University in 1930. He became professor in 1933 and chairman of the department of zoology and entomology in 1942. From 1934 to 1947, when he resigned from Ohio State, he was professor of medical genetics. Snyder and his students broadened their genetical studies to include PTC taste deficiency and other nonpathological traits. They became interested in frequency distributions of traits and alleles among population units. A paper that appeared in 1934 gave evidence that the group had found the need to seek better methods for analyzing human genetical data. The laboratory became recognized as the center in this country for the study of human genetics.

Universities, professional groups, and lay groups began to show increased interest in Snyder and the published results of his research. He received numerous invitations to give special lectures. His willingness to accept these invitations has had a great influence on the progress of human genetics. Snyder's enthusiasm for the subject and his firm convictions about the benefits man can expect from increased knowledge of human genetics helped to create confidence on the part of the audience in the lecturer and a willingness to listen to him. Snyder matched this reaction with an ability to explain the subject to a group who knew little about genetics.

In 1947 Snyder accepted an appointment as dean of the Graduate School and professor of medical genetics with the University of Oklahoma. He is continuing his research and lecture program.

Even with the heavy schedule he followed Snyder took part in activities of national societies and organizations. He has been vice president of the American Society of Naturalists (1941), the American Society of Zoologists (1943), and the Association for Research in Nervous and Mental Diseases (1953). The Eugenics Research Association chose him to be president in 1937. He was secretary-treasurer (1944–46), vice president (1947), and president (1948) of the Genetics Society of America, and president (1950) of the American Society of Human Genetics. Snyder has been editor of the *Ohio Journal of Science* and of the *American Journal of Human Genetics*.

With his understanding of the relationship of science to human affairs, Snyder will be valuable to the Association as an intermediary between the scientists and the public. He has the admirable characteristic of being a good listener, and a group or individual with whom he meets will quickly relax and feel at ease. The AAAS is fortunate in the choice of Laurence H. Snyder as its president elect.

*Accuracy is the twin brother of honesty.*—TRYON EDWARDS.

# AAAS Council Meeting, 1955

Dael Wolfle

The Council of the American Association for the Advancement of Science held its 1955 meeting in two sessions, at 4 P.M. on 27 Dec. and at 9 A.M. on 30 Dec. Both sessions were held in the Hotel Dinkler Plaza in Atlanta, Ga., and both were presided over by President George W. Beadle. Attendance at the first session was 96, and at the second session, 86.

## Elections and Officers

The Council elected Laurence H. Snyder as president elect, and Paul M. Gross and George R. Harrison as members of the Board of Directors. Also elected were the vice presidents and chairmen of sections, whose names are included in the complete list of officers given on pages 271–272. Council voted to authorize the Board of Directors to elect vice presidents for those sections that had not submitted nominations at the time of the Council meeting.

## Constitution and Bylaws

At its 1953 meeting, Council decided that a review of the Association's constitution and bylaws was desirable and authorized the appointment of a committee to prepare desirable changes. The committee, under the chairmanship of Wallace Brode, made an interim report at the 1954 meeting. Its final report was published, in substance, in *Science* (25 November 1955) and in *The Scientific Monthly* (December 1955). The changes recommended by the committee and endorsed by the Board of Directors were approved by Council and are incorporated in the revised constitution and bylaws that appear on pages 263–266.

## Resolutions

The Council committee on resolutions (Harold H. Plough, chairman, and Detlev W. Bronk, Jane M. Oppenheimer, and Bruce D. Reynolds) considered a number of resolutions that had been submitted by several individuals and associations. Most attention, both by the committee and in the Council meeting, was given to a resolution concerning the conditions under which meetings of the Association might properly be held.

In the several months prior to the Atlanta meeting, the Association received a number of statements of objection to the holding of a meeting under circumstances that did not permit unsegregated housing, eating, and transportation accommodations for all members. These conditions were not, and under existing laws could not be, met in Atlanta. This fact had been known to the Board of Directors when the decision to hold a meeting in Atlanta was reached in 1953 and was known by Council when the Atlanta meeting was discussed at the 1953 meeting.

The Board of Directors believed that in spite of the difficulties presented by enforced segregation, a meeting in Atlanta was nevertheless desirable because of the advantages of bringing a meeting to a region of the country that has shown marked scientific, technologic, and educational growth since the last visit of the AAAS, and of thus making it easier for the scientists, regardless of color, of that region to attend than would be possible if all meetings were held in other parts of the country. Moreover, the meeting itself was unsegregated, and in the minds of some of the participants the holding of a conspicuously unsegregated meeting was itself a positive contribution toward the breakdown of segregation practices. In this climate of differing points of view, the Committee on Resolutions considered the various resolutions that had been submitted and prepared for Council's consideration the following resolution.

"The American Association for the Advancement of Science is a democratic association of all its members; no one is barred from election because of race or creed. All members are privileged to cooperate freely in the fulfillment of the Association's high objectives which are the furtherance of science and human welfare. No member is limited in his service because of race or creed.

"In order that the Association may attain its objectives, it is necessary and desirable that all members may freely meet for scientific discussions, the exchange of ideas, and the diffusion of established knowledge. This they must be able to do in formal meetings and in informal social gatherings. These objectives cannot be fulfilled if free association of the members is hindered by unnatural barriers.

"Therefore be it resolved that the annual meeting of the American Association for the Advancement of Science be held under conditions that make possible the satisfaction of those ideals and requirements."

After extensive debate over the effects and propriety of adopting such a resolution, and following the defeat of motions to table the resolution and to make it an order of business at the 1956 meeting, Council voted to submit the resolution by mail to the entire Council membership. It was further voted that following the receipt of ballots on the resolution, the AAAS office should publish the resolution and the vote on it.

It can now be reported that the resolution was adopted by a mail vote of 224 to 31, with 3 abstaining, and that the resolution and the fact of its adoption were on 23 January 1956 released to the press.

As a second resolution, the committee recommended adoption of the following:

"BE IT RESOLVED that the American Association for the Advancement of Science endorses the efforts being made to amend the McCarran-Walter Act to remove those provisions that limit the travel of recognized foreign scholars and scientists to this country, for limitation on the free interchange of knowledge constitutes a serious impediment to scientific progress."

Council voted to adopt this resolution.

As a third resolution, the committee recommended adoption of the following:

"BE IT RESOLVED that the American Association for the Advancement of Science favors the use of funds of the United States through the National Science Foundation and other appropriate government agencies to supplement the travel costs of U.S. citizens to attend scientific meetings and congresses in foreign countries on the ground that the interchange of information resulting greatly strengthens our own scientific competence."

Council voted to adopt this resolution.

As a fourth resolution, the committee recommended the following:

"BE IT FURTHER RESOLVED that the American Association for the Advancement of Science wishes to express its appreciation and thanks to the local committee and all other individuals and organizations who have cooperated to make our 1955 meetings pleasant and

profitable. We will take back to our homes an enhanced regard for the hospitality and an increased respect for the scientific and educational institutions in and around Atlanta."

Council voted to adopt this resolution.

Finally, the committee reported that it had considered several other resolutions but that it had decided not to recommend any of them for adoption. From the floor it was moved that Council adopt the following resolution that calls for the creation of an interim committee on the social aspects of science.

"Whereas science has become one of the major factors of modern civilization; and whereas its rapid development has and is producing many major sociological problems affecting the efficiency of research, the application of the results of research, the incorporation of its concepts and its results into the social structure, and the actual conduct of research and the development of science; and whereas it is highly likely that the welfare of science and of society will be promoted by a comprehensive examination of the problems being created; and whereas the American Association for the Advancement of Science is representative of the broad scope of science and has already assumed some responsibility for the broad problems created by science; it is hereby resolved that the Council of the American Association for the Advancement of Science should organize an interim committee to be called 'The Interim Committee on the Social Aspects of Science.' It is recommended that this committee shall be composed of five members of the Council and be appointed by the president of the AAAS for a period of 1 year. The committee shall examine generally the sociological problems being created by science and present to the next annual meeting of the Council recommendations for action if such are found necessary."

Council voted to adopt this resolution and instructed the president to appoint the committee.

At the conclusion of the report of the Committee on Resolutions, Council voted a resolution of thanks to the committee for its excellent work.

AAAS Operating Fund Budget, 1956

| Item | Receipts |
|---|---|
| Dues of annual members | $310,000 |
| Journal subscriptions (Treasurer) | 3,530 |
| Members' special subscriptions | |
| *Science* | 2,800 |
| *The Scientific Monthly* | 16,500 |
| Nonmember subscriptions | |
| *Science* | 43,000 |
| *The Scientific Monthly* | 20,000 |
| Miscellaneous sales | |
| *Science* | 1,600 |
| *The Scientific Monthly* | 1,600 |
| Advertising | |
| *Science* | 200,000 |
| *The Scientific Monthly* | 15,000 |
| Sale of: | |
| Microcards | 450 |
| Binders | 1,600 |
| Symposium volumes | 21,000 |
| Emblems | 1,600 |
| Other sales | 600 |
| Meeting | |
| Registrations, program sales | 5,500 |
| Program advertising | 2,000 |
| Contributions | 6,000 |
| Exposition | |
| Booth space | 14,000 |
| Science library | 1,500 |
| Rental receipts | 8,000 |
| Income from investments | 9,500 |
| Cash discounts | 200 |
| Other receipts | 300 |
| High-school science libraries | 1,000 |
| STIP | 9,000 |
| Total receipts | $696,280 |

| Item | Expenses | Authorized limits for individual items |
|---|---|---|
| General administrative expenses | | |
| Salaries | $189,000 | $215,000 |
| Insurance, retirement, and social security | 13,300 | 15,000 |
| Building maintenance | 20,500 | 24,000 |
| Rent | 7,000 | 8,000 |
| Interest on mortgage | 7,800 | 7,800 |
| Supplies and equipment | 20,800 | 25,000 |
| Telephone and telegraph | 3,000 | 3,800 |
| Postage | 12,500 | 13,500 |
| Travel | 5,500 | 6,500 |
| Miscellaneous | 13,800 | 16,000 |
| Printing | | |
| *Science* | 240,000 | 260,000 |
| *The Scientific Monthly* | 60,000 | 65,000 |
| Symposium volumes | 15,000 | 20,000 |
| Annual meeting | | |
| Meeting and exposition | 19,800 | 22,000 |
| Press service | 5,000 | 5,500 |
| Sections, divisions, boards, and committees | | |
| Section expenses | 5,000 | 6,000 |
| Allowances to divisions | 7,500 | 8,000 |
| Board of directors | 6,500 | 7,400 |
| Editorial board and publications committee | 8,000 | 9,500 |
| Other committees | 2,000 | 3,500 |
| Advertising, cost of selling | 39,000 | 42,000 |
| Miscellaneous | 1,000 | 2,500 |
| Contingency and new activities | 10,000 | 10,000 |
| Total operating fund | $712,000 | |
| Plus partial repayment of building loan | 14,000 | |
| | $726,000 | |

Within individual budget categories, expenditures up to the amounts indicated in the column headed "Authorized limits for individual items" are allowed, so long as the total expenditures do not go above the approved total amount, $712,000 (or $726,000, including $14,000 for repayment of funds borrowed for construction of the headquarters building). It should be noted that this budget applies only to the Association's operating funds and does not include funds in the treasurer's account or money to be spent on such special projects as the Science Teaching Improvement Program.

## Election Procedure

At the 1954 Council meeting there was considerable discussion of the shortcomings of the existing method of conducting Association elections for the offices of president elect and member of the Board of Directors. At that meeting, the Committee on Constitution, Bylaws, and General Operations was requested to bring to the 1955 meeting recommendations for an altered election system. The committee recommended establishment of a nominating committee to consist of two members of the Board of Directors, the senior member to serve as chairman, and five members of Council. Terms are for 2 years and are to be staggered so that the terms of at least three members, including one from the Board of Directors, will expire each year. The nominating committee will use such means as it decides upon—but it was recommended that the policy of sending a nominating ballot to all members of Council be continued—to select a slate of two or more nominees for each position for which an election is to be held. The names of the nominees will be published in time to permit the addition of other names by petition signed by 30 or more members of Council. Election will then be conducted by mail ballot, with a preferential

Paul M. Gross (left), vice president and dean of Duke University, Durham, N.C., and George R. Harrison (right), professor and dean of science at Massachusetts Institute of Technology, Cambridge, are new members of the AAAS Board of Directors. Gross, who is also president of the Oak Ridge Institute of Nuclear Studies and vice chairman of the National Science Board, has done his chief scientific work in physical chemistry. Harrison has served in a civilian capacity with the U.S. Atomic Energy Commission and the Office of Scientific Research and Development. His scientific field is physics. [Harrison photo by Fabian Bachrach]

ballot being used in case there are more than two persons nominated for an office. Results of the election will be announced at the following meeting of Council and/or will be published.

Council voted to adopt this revised election procedure. It will therefore be the one used in the election during the fall of 1956. In order to get the new procedure started, it was necessary to select the members of the nominating committee. Wallace Brode, chairman of the committee that had recommended the revised procedure, served as chairman of an ad hoc committee to present a slate of names for membership on the nominating committee. He reported that the Board of Directors had selected Chauncey D. Leake for a 1-year term and Margaret Mead for a 2-year term. Upon recommendation of the committee, Council elected Barry Commoner and H. B. Sprague for 1-year terms and Marsh White, Nelson Sayer, and Milton Lee for 2-year terms.

As alternates for any of the Council members who might not be able to serve, Council elected George Paffenbarger, Jane Oppenheimer, Bentley Glass, and Murray Luck.

### Affiliates and Associates

Upon recommendation of the Committee on Affiliation and Association, Council elected the following five organizations to affiliate status:

American Documentation Institute

American Institute of Chemists

American Institute of Industrial Engineers

The National Society of Professional Engineers

Poultry Science Association

and the following two organizations to associate status:

Council of American Bioanalysts

Society for Industrial and Applied Mathematics

Upon recommendation of the Academy Conference, Council voted to suspend the affiliate status of the Missouri Academy of Sciences, since this organization has become completely inactive.

Following these actions, the figures on affiliated and associated organizations became: affiliated societies, 169; affiliated academies of science, 41; associated societies, 55; total, 265.

### Other Business

The Council discussed means of increasing attendance at its meetings and considered a suggestion from the Committee on Constitution, Bylaws, and General Operations that the Association might charge each of its affiliates an annual fee and use the money so obtained to help pay travel expenses of Council members. Council instructed the Board of Directors to consider this suggestion and to correspond with the affiliated societies to determine their views.

Three reports were given. Warren Weaver, chairman of the Board of Directors, reported activities and plans of the committees appointed by the National Academy of Sciences–National Research Council to study the effects of radiation. These committees were of special interest because Council had voted at the 1954 meeting to instruct Weaver to appoint a similar committee for the Association. Discussions subsequent to the 1954 meeting made it apparent that there would be considerable overlap in function and probably also in personnel between the two bodies. Upon Weaver's recommendation, Council therefore voted, by mail, to rescind its earlier instruction.

Weaver's report indicated that the intention of the decision to appoint an Association committee was being carried out, even though the Association itself did not have a committee working on radiation effects. Dael Wolfle, administrative secretary, reported on the major program activities of 1955 and the Association's financial situation. The financial balance sheet for 1955 cannot be reported until after it has been audited, but preliminary figures indicate that income and expenses for the year were approximately in balance. He reported also that gifts and grants either unrestricted or for special purposes received or committed during the year amounted to $430,000. John Mayor, director of the Science Teaching Improvement Program, reported on the activities and plans directed toward the improvement of the teaching of science and mathematics at the high-school level.

The amended constitution and bylaws provide for the naming of certain organizations as "participating organizations." Such organizations are defined as ones whose programs are planned and carried out in close cooperation with the Association. They are entitled to such representation in Council as the Board of Directors and the Council may determine. Council voted to elect the Gordon Research Conferences as a participating organization—the first organization to be elected to this status—and voted also to invite the Conferences to name two representatives to Council.

President Beadle announced that the budget for 1956 could not be presented to the Council meeting but would be published as part of the proceedings of the meeting. It appears on page 269.

*I love fools' experiments. I am always making them.*—CHARLES DARWIN.

# AAAS Officers, Committees, and Representatives for 1956

Following are the officers, committee members, and representatives of the American Association for the Advancement of Science. (Dates in parentheses indicate year of expiration of term.)

President: Paul B. Sears (1957), Yale University

President Elect: Laurence H. Snyder (1958), University of Oklahoma

Retiring President and Chairman of the Board of Directors: George W. Beadle (1956), California Institute of Technology

### Other Members of the Board of Directors

Mark H. Ingraham (1956), University of Wisconsin

Paul E. Klopsteg (1956), Glenview, Illinois

Wallace R. Brode (1957), National Bureau of Standards

Thomas Park (1957), University of Chicago

Chauncey D. Leake (1958), Ohio State University

Margaret Mead (1958), American Museum of Natural History

Paul M. Gross (1959), Duke University

George R. Harrison (1959), Massachusetts Institute of Technology

Paul A. Scherer (ex officio), Carnegie Institution of Washington

Dael Wolfle (ex officio), AAAS

### Vice Presidents and Chairmen of the Sections

*A* Mathematics: D. H. Lehmer, University of California, Berkeley

*B* Physics: William F. Meggers, National Bureau of Standards

*C* Chemistry: Karl Folkers, Merck and Company

*D* Astronomy: Peter van de Kamp, Swarthmore College

*E* Geology and Geography: not yet appointed

*F* Zoological Sciences: Bentley Glass, Johns Hopkins University

*G* Botanical Sciences: Paul J. Kramer, Duke University

*H* Anthropology: William L. Straus, Jr., Johns Hopkins University

*I* Psychology: Clarence H. Graham, Columbia University

*K* Social and Economic Sciences: Benjamin H. Williams, Industrial College of the Armed Forces

*L* History and Philosophy of Science: Henry Guerlac, Cornell University

*M* Engineering: Clarence E. Davies, American Society of Mechanical Engineers

*N* Medical Sciences: Irvine H. Page, Cleveland Clinic

*Nd* Dentistry: H. Trendley Dean, American Dental Association

*Np* Pharmacy: Rudolph H. Blythe, Smith, Kline and French Laboratories

*O* Agriculture: H. B. Sprague, Pennsylvania State University

*P* Industrial Science: Monroe E. Spaght, Shell Oil Company

*Q* Education: D. A. Worcester, University of Nebraska

### Administrative Officers Appointed by the Board of Directors

Executive Officer: Dael Wolfle

Treasurer: Paul A. Scherer

Associate Administrative Secretaries: Raymond L. Taylor and John A. Behnke

Editor: Graham DuShane

### Secretaries of the Sections

*A* Mathematics: Rudolph E. Langer (1956), University of Wisconsin

*B* Physics: J. Howard McMillen (1959), National Science Foundation

*C* Chemistry: Edward F. Degering (1956), QM Corp, USA, Natick, Mass.

*D* Astronomy: Frank K. Edmondson (1957), Goethe Link Observatory, Indiana University

*E* Geology and Geography: Robert L. Nichols (1956), Tufts College

*F* Zoological Sciences: Harold H. Plough (1959), Amherst College

*G* Botanical Sciences: Barry Commoner (1959), Washington University, St. Louis

*H* Anthropology: Gabriel W. Lasker (1957) Wayne University College of Medicine

*I* Psychology: Conrad G. Mueller (1956), Columbia University

*K* Social and Economic Sciences: Donald P. Ray (1958), George Washington University

*L* History and Philosophy of Science: Jane M. Oppenheimer (1958), Bryn Mawr College

*M* Engineering: Frank D. Carvin (1956), Illinois Institute of Technology

*N* Medical Sciences: Allan D. Bass (1956), Vanderbilt University School of Medicine

*Nd* Dentistry: Russell W. Bunting (1958), University of Michigan School of Dentistry

*Np* Pharmacy: John E. Christian (1958), Purdue University School of Pharmacy

*O* Agriculture: F. D. Keim (1957), University of Nebraska

*P* Industrial Science: Allen T. Bonnell (1956), Drexel Institute of Technology

*Q* Education: Herbert A. Smith (1959), University of Kansas

### Officers of the Pacific Division

President: Robert B. Brode, University of California, Berkeley

President Elect: J. Murray Luck, Stanford University

Retiring President: Edwin R. Guthrie, University of Washington

Secretary: Robert C. Miller, California Academy of Sciences

Council Representative: Robert C. Miller

### Officers of the Southwestern and Rocky Mountain Division

President: E. F. Castetter, University of New Mexico

Vice President: Marlowe G. Anderson, New Mexico College of Agriculture and Mechanic Arts

Executive Secretary: Frank E. E. Germann, University of Colorado

Council Representative: Frank E. E. Germann

### Officers of the Alaska Division

President: Neil W. Hosley, University of Alaska

Vice President: John Dassow, Fisheries Research Laboratory, U.S. Fish and Wildlife Service, Ketchikan

Secretary: Arthur Buswell, Extension Service, University of Alaska

Council Representative: Troy L. Péwé, U.S. Geological Survey, College

### Standing Committees

Affiliation and Association

Fernandus Payne (1956), chairman, Indiana University

I. Melville Stein (1957), Leeds & Northrup Company, Philadelphia

Fredrick J. Stare, Jr. (1958), Harvard School of Public Health

Herbert Carter (1959), University of Illinois
Luna Leopold (1960), U.S. Geological Survey, Washington, D.C.
Dael Wolfle, ex officio
John A. Behnke, staff representative

AAAS Meetings
Harry C. Kelly (1956), chairman, National Science Foundation
Clarence E. Davies (1956), American Institute of Mechanical Engineers, New York
Arthur W. Galston (1956), Yale University
Howard M. Phillips (1958), Emory University
Dael Wolfle and Raymond L. Taylor, staff representatives

Executive
George W. Beadle, chairman
Paul B. Sears
Laurence H. Snyder
Wallace R. Brode
Paul E. Klopsteg
Dael Wolfle

Investment and Finance
Sheldon B. Akers (1956), vice chairman, Brookings Institution
F. P. H. Siddons (1957), chairman, American Security & Trust Company, Washington, D.C.
Malvern F. Morse (1958), American Security & Trust Company
Wallace R. Brode (1959)
J. E. Graf (1960), Smithsonian Institution
Paul A. Scherer, ex officio
Dael Wolfle, ex officio
Hans Nussbaum, staff representative

Publications
Paul B. Sears (1956)
Thomas Park (1957), chairman
Ralph R. Shaw (1958), Rutgers University
Chauncey D. Leake (1959)
George R. Harrison (1960)
Dael Wolfle, ex officio
Graham DuShane and John A. Behnke, staff representatives

**Special Committees**

AAAS-Anne Frankel Rosenthal Memorial Award for Cancer Research
Warren Weaver, chairman, Rockefeller Foundation
Jacob Furth, American Association for Cancer Research
G. Burroughs Mider, National Cancer Institute
Richard L. Rosenthal, The Richard and Hinda Rosenthal Foundation
C. Chester Stock, Sloan-Kettering Institute for Cancer Research
Harry M. Weaver, American Cancer Society

Management and Business Operations
Mark H. Ingraham, chairman
George J. Beal, Rockefeller Foundation (retired)
F. P. H. Siddons
Paul A. Scherer, ex officio
Dael Wolfle, ex officio

Membership Development
Ralph W. Gerard, chairman, University of Michigan, Ann Arbor
Clarence E. Davies
Rensis Likert, University of Michigan
All members of the AAAS staff as consultants

Nominations
Chauncey D. Leake (1956), chairman
Margaret Mead (1957)
Barry Commoner (1956)
H. B. Sprague (1956)
Marsh W. White (1957), Pennsylvania State University
A. Nelson Sayre (1957), U.S. Geological Survey
Milton O. Lee (1957), Federation of American Societies for Experimental Biology

Research Grants, AAAS
Barry Commoner, chairman
E. Lowell Kelley, University of Michigan
Hans Nussbaum
Laurence H. Snyder
H. Burr Steinbach, University of Minnesota
Dael Wolfle, staff representative

Retirement Plan (must be three staff members)
Dael Wolfle, chairman
Hans Nussbaum
Raymond L. Taylor

Source Books in the History of Science
Gregory D. Walcott, chairman, Long Island University
Harlow Shapley, Harvard University
Edmund W. Sinnott, Yale University
John A. Behnke, staff representative

**Committees To Be Appointed**

Interim Committee on the Social Aspects of Science
Newcomb Cleveland Prize, Judges
Resolutions
Socio-Psychological Prize, Judges
Theobald Smith Award in the Medical Sciences, Judges

**Representatives**

On American Council on Education
Mark H. Ingraham
John R. Mayor, AAAS

Of Board of Directors on Cooperative Committee on the Teaching of Science and Mathematics
Harold K. Schilling, Pennsylvania State University

On Board of Trustees of Science Service
Kirtley Mather (1956), Harvard University
Paul B. Sears (1957)
Karl Lark-Horovitz (1958), Purdue University

On Council of National Organizations of the Adult Education Association of the United States
John A. Behnke

On Council of Old World Archeology
Richard K. Beardsley, University of Michigan

On Committee on the Kimber Genetics Award of the National Academy of Sciences
I. Michael Lerner, University of California, Berkeley

On National Citizens Committee for Educational Television Advisory Committee
John A. Behnke

On National Committee for UNESCO
Elvin C. Stakman, University of Minnesota, St. Paul

On National Conference on FAO
Noble Clark, University of Wisconsin, Agricultural Experiment Station

On Scientific Manpower Commission
Detlev W. Bronk, Rockefeller Institute for Medical Research (Wallace R. Brode, alternate)
Dael Wolfle

On U.S. Committee on ISO Technical Committee 37—Terminology
Duane Roller, Ramo-Wooldridge Corporation, Los Angeles

## AAAS Membership

1) *Changes during 1955*

| | | |
|---|---|---|
| New members | | 5,395 |
| Deaths | 273 | |
| Resignations | 1,068 | |
| Automatic resignations | 2,525 | 3,866 |
| Net increase during 1955 | | 1,529 |

2) *Totals as of 31 Dec. 1955*

| | |
|---|---|
| Paid for 1955 | 32,922 |
| Paid through March 1956 | 599 |
| Paid through June 1956 | 10,976 |
| Paid through Sept. 1956 | 1,073 |
| Life members, etc. | 791 |
| In good standing | 46,361 |
| In arrears | 2,971 |
| | 49,332 |
| New for 1956 | 857 |
| Total membership | 50,189 |

# Atlanta Meeting in Retrospect

Raymond L. Taylor

For the more than 4000 persons who attended, the 122nd meeting of the American Association for the Advancement of Science in Atlanta, Ga., will long be remembered, not only for the high quality and timeliness of the programs and for the opportunities for scientists of different disciplines to commingle with colleagues from all parts of the continent, but also for the friendliness and helpfulness shown generally by the local citizens with whom the visitors came in contact. It was a notably pleasant meeting in a historic city, which, since the previous meeting there in 1913, has shown many developments in science, technology, public health, and education.

Between the first few events on 26 Dec.—a panel of Section Q, "Developing leaders in science"; a symposium of the American Association of Clinical Chemists; and Section F's first session for contributed papers—and the two final events of 30 Dec.—the sixteenth annual address of the United Chapters of Phi Beta Kappa, "Science and the other humanities," given by Laurence M. Gould, president of Carleton College, and an open house for astronomers at Agnes Scott College's Bradley Observatory—there were some 250 sessions devoted to symposia, groups of invited papers, panel discussions, short reports of current research, addresses, lectures, business meetings, meal functions, tours, and field trips. There were programs sponsored or cosponsored by the Association as a whole, by 17 of the 18 AAAS sections, and by 68 participating societies and other organizations.

As usual, with so many sessions crowded into the principal 4 days, the substantial over-all attendance was subdivided into areas of major interests. For the first time in recent years, no secretary or program chairman wished to hold sessions on 31 Dec. Despite efforts to avoid the scheduling of concurrent sessions likely to appeal to the same potential audiences, there were several instances where this was not possible. Some outstanding programs had audiences smaller than they deserved—partly because of such conflicts and partly, probably, because of insufficient premeeting publicity by those who arranged them. The schedules of some of the participating societies were so compressed or intensive that little or no time was available for other programs except at the expense of their own sessions. At any particular session, however, each program chairman or presiding officer could be sure that his speakers were addressing an audience that had chosen his program above all others and despite such distractions as committee meetings, informal conferences, or "convention fatigue."

The events sponsored by the Association as a whole had good attendance. This was particularly true of the special program, "The crisis in science education," the time for which had been cleared by all sections and by most of the participating societies, and the AAAS presidential address, on 28 Dec., by courtesy, generally left free by the participating societies whenever possible. The papers of the education program by Charles Dollard, formerly president of Carnegie Corporation of New York; Arthur S. Flemming, director, Office of Defense Mobilization; and Alan T. Waterman, director, National Science Foundation, will be published in one of the Association's journals.

Taking all factors into account, the second Atlanta meeting was successful in its primary objectives. Among the participating societies, the annual national meeting of the American Phytopathological Society had a gratifyingly large number of its members in attendance, the American Society of Parasitologists had to open additional concurrent sessions for its 130 papers and seek larger session rooms, and the four science teaching societies were pleased with the size of their registrations. The Association appreciates the large number of AAAS registrations by the members of these and of other participating societies.

Among the 64 symposia, the following were noteworthy for their interdisciplinary scope: "Atomic energy and agriculture," sponsored jointly by the AAAS and the Oak Ridge Institute of Nuclear Studies; the three sessions of the International Geophysical Year; Section C's "Patterns of biochemical and histological responses to chemical agents"; "The species problem" of the Association of Southeastern Biologists; "Applications of serology in biological research," sponsored by the Society of General Physiologists; Section L's "Creativity in science"; "Socioeconomic aspects of orthopedic engineering," arranged by Section M; Section N's "Microbiology and medical research"; and "Physiological bases in psychiatry," sponsored jointly by the American Psychiatric Association and the American Physiological Society. Most of these were two or four sessions in length and had speakers from many parts of the country.

There were also the customary features expected at AAAS meetings—outstanding evening addresses sponsored by the Society of the Sigma Xi, the Scientific Research Society of America, the National Geographic Society, and the United Chapters of Phi Beta Kappa; large-scale exhibits; the latest foreign and domestic scientific films; and the traditional "Biologists' Smoker" (for all registrants) with refreshments and cigarettes again generously contributed by the Coca-Cola Company, the National Biscuit Company, and Philip Morris Incorporated.

## Planning the Meeting

The decision to meet in Atlanta was made by the AAAS board of directors at their June meeting in 1953 after a survey of the physical facilities of the city and after a careful consideration of all advantages and disadvantages.

In common with other large national scientific organizations, the AAAS has consistently met in different sections of the United States and Canada, as physical facilities would permit, in order to make it possible, at least at intervals, for all of its members to attend the annual convention at minimum expense. The 1954 meeting in Berkeley, Calif., the Association's first national winter meeting on the Pacific Coast, was a recognition, long overdue, of the ever-growing AAAS membership west of the Rockies. Similarly, the 1955 meeting in Atlanta was a return to the South for the first time since the Dallas meeting of 1941, and to the Southeast, since the Richmond, Va., meeting of 1938. The first AAAS meeting in a southern state was the Charleston, S.C., meeting, in 1850, when the Association was 2 years old. The enlarged Municipal Auditorium of Atlanta, the splendid new classroom building of the nearby State College of Business Administration, and additions to Atlanta's downtown hotel facilities once more made it pos-

sible to hold a meeting of substantial size in this growing metropolis of the Southeast.

Those who attend a large scientific meeting, unless they have shared in making some of the arrangements, may not appreciate the amount of planning and work that eventually results in several hundred sessions, most of them requiring one or more types of projection equipment. The cooperation and services of a great many individuals are essential. Usually, an experienced convention bureau will operate a housing bureau and provide registration personnel, but everything else must be arranged by the sponsoring organization. Local committees must be set up, preferably in the preceding year. This has been the pattern of AAAS meetings in the postwar years. Early each spring the secretary of each section and participating society is asked to estimate the probable number of sessions and his best guess of the probable attendance at each. It is easy to over- or underestimate when, at this stage, the programs are still far from complete and calls for papers may not have gone out. Soon afterward, on the basis of session room requirements and preferences, the headquarters hotels for related sections and societies are decided upon.

In Atlanta it was possible to assign to the relatively large American Phytopathological Society the Atlanta Biltmore Hotel, best suited for that group's many concurrent sessions and other functions, and to meet the preferences of the zoological and science teaching societies for the recently enlarged Hotel Dinkler Plaza. The Municipal Auditorium, six or seven blocks from the downtown hotels, was the logical site for the center of the meeting—the Main Registration-Information Center, the Visible Directory of Registrants, the exhibits, the Science Theatre, and a snack bar open to all registrants. Most of the sectional programs were held in the session rooms of this auditorium and in the new classroom building of the State College of Business Administration, immediately across the street. It was necessary, however, to hold sessions in several other hotels, the Henry Grady, Piedmont, Georgian Terrace, and Georgia. By choice of the organizations concerned, there were a few events on such widely scattered campuses as Agnes Scott College, Atlanta University, Emory University, and Georgia Institute of Technology.

Table 1. Analysis of sessions at second Atlanta meeting.

| | |
|---|---|
| Sessions for symposia, invited papers, and panels | 94 |
| Sessions for contributed papers | 66 |
| Sessions with addresses or lectures | 24 |
| Business sessions | 37 |
| Meal functions | 26 |
| Tours and field trips | 8 |
| Total number of sessions | 255 |

Table 2. Comparison of AAAS-sectional and societal programs.

| Item | AAAS, its sections, and conferences | Participating societies | Total number of sessions with papers | Total number of papers |
|---|---|---|---|---|
| Sessions for symposia, invited papers, and panels | 47 (209 papers) | 47 (239 papers) | 94 | 448 |
| Sessions for contributed papers | 22 (168 papers) | 44 (409 papers) | 66 | 577 |
| Sessions for addresses and lectures | 12 (16 speakers) | 12 (19 speakers) | 24 | 35 |
| Total | | | 184 | 1060 |

The Atlanta Biltmore and nearby Georgian Terrace and Cox-Carlton hotels, which are 1½ miles north of the downtown hotels, were well served by the trackless trolleys and buses of the Atlanta Transit Company. For additional transportation, however, these hotels were linked with the downtown hotels and the Municipal Auditorium by shuttle buses chartered by the Association. These proved particularly convenient in carrying people to and from Atlanta University for the zoologists' and botanists' dinners and the AAAS presidential address and reception.

## AAAS Presidential Address and Reception

On the customary evening, 28 December, the traditional address by the retiring, 107th, president of the Association, Warren Weaver, was given in the attractive Sisters Chapel of Spelman College of Atlanta University. AAAS president George W. Beadle presided. Robert S. Lynch, president of the Atlantic Steel Company, and general vice chairman of the Atlanta committees, welcomed the Association and the sizable audience on behalf of the entire scientific and academic community. President Beadle, after a brief tribute to a distinguished scientific career, then presented the speaker of the evening whose well-delivered address, "Science and people" [*Science* **122**, 1255 (1955)], emphasized that science, essentially, is not an esoteric field for human endeavor; scientists are like other people; and the fruits of their researches belong to all the people. Other members of the platform party included Paul B. Sears, who assumed office as AAAS president 15 Jan. 1956; Rufus E. Clement, president, Atlanta University; Albert E. Manley, president, Spelman College; Dael Wolfle, executive officer, and Raymond L. Taylor, associate administrative secretary.

Immediately following the address a reception was held in the adjacent gymnasium. It was a pleasant climax to a crowded day and one of the highlights of the meeting.

## AAAS General Symposium

Early last year the Oak Ridge Institute of Nuclear Studies accepted the Association's invitation to arrange a symposium on the same high level as its programs at the AAAS meetings of 1950, 1951, and 1952. As the committee headed by Cyril Comar, principal scientist, Medical Division, ORINS, developed its plans, the four-session symposium, "Atomic energy and agriculture," evolved partly in recognition of the South's emergence as one of the great sources of food for the whole nation and partly because of the important implications of the uses of radioisotopes in the agricultural sciences. In view of the scope and stature of this program, which was coordinated with the subsequent conference at East Lansing, Mich., 12–14 Jan., its four parts—soil-plant relationships, plant metabolism and crop improvement, animal metabolism, and food sterilization—were cosponsored by the Association as a whole and by Section O. Additional cosponsors of part I were Section G and the Ecological Society of America; of part II, Section G and the American Society of Plant Physiologists, Southern Section; and of part III, Section F. This program will appear as an AAAS symposium volume.

## Other Symposia

At Atlanta there were 63 other programs, classifiable as symposia, groups of invited papers, or panels that centered about particular themes. Thirty-one of these were sponsored by 14 of the 17 AAAS sections; another 32 had been arranged by 39 of the 68 participating organizations. This total exceeds the num-

ber at any previous AAAS meeting, except at Berkeley in 1954. It would be impracticable to repeat here the entire list, which has appeared both in the General Program-Directory and in the preconvention issue of *Science*, but a few that were interdisciplinary in scope have already been mentioned. Of interest is the fact that the societies arranged exactly the same number of such programs as did the Association and its sections; moreover, each group of 32 occupied 47 sessions, as may be noted in Table 1.

### Analysis of Sessions

A comparison of the types of sessions primarily sponsored by AAAS sections and by the societies (there were, of course, instances of joint sessions of sections, of societies, and of sections and societies) shows, as might be expected, that societies holding their annual national meetings with the Association arrange proportionately more sessions for short contributed papers on current research than do the sections that concentrate on symposia. A gratifying number of societies, which hold regional or special meetings with the AAAS, also feature symposia. At Atlanta, as in previous years, about half of the sections had one or more sessions each for contributed papers; specifically, 9 sections had a total of 22 sessions for 16 contributed papers.

The point is sometimes made that the papers contributed or read before AAAS sections are inferior to papers sponsored by a professional society in the fields of these sections. This does not, or need not, follow if the secretary or program chairman of the section maintains standards comparable to those of the societies. The AAAS sections that schedule sessions for contributed papers do not do so when societies in their field are meeting with the Association; they do not seek to compete but rather, to render a service to those who did not attend a national meeting in their specialty or did not have a paper ready at the time of that meeting. Over the years, several winners of the Association's Newcomb Cleveland prize have been authors in sectional sessions for contributed papers. A summary of the comparison between sectional and societal programs is given in Table 2.

### Conferences

At present there are three recurrent conferences at AAAS meetings. The Academy Conference, made up of the official delegates of the 41 active academies of science affiliated with the Association and others interested in academy affairs, had a full day on 28 Dec. with a business meeting in the morning, a panel discussion on the role of the academies in the AAAS Science Teaching Improvement Program, and an address on science fairs by Clinton L. Baker in the afternoon, followed in the evening by the annual Academy Conference dinner.

The Conference on Scientific Manpower dropped its plans for a separate program this year, to cosponsor the Association's special program, "The crisis in science education." On 27 Dec., the first of the seven AAAS special sessions—the annual address of the Society of the Sigma Xi, held in conjunction with its 56th convention—had dealt with manpower problems in the paper, "Is there a scarcity of scientists," by James R. Killian, Jr., president, Massachusetts Institute of Technology. Finally, the two sessions of the AAAS Cooperative Committee on the Teaching of Science and Mathematics were concerned with specific aspects of this complex problem.

The Conference on Scientific Editorial Problems at this meeting experimented with five concurrent discussion panels preceded and followed by plenary sessions. The tentative plans for this year's New York meeting are to revert to six or more consecutive sessions for the entire attendance.

Table 3. Distribution of paid registrants by states and countries.

| | |
|---|---|
| Alabama | 86 |
| Arizona | 3 |
| Arkansas | 16 |
| California | 49 |
| Colorado | 7 |
| Connecticut | 32 |
| Delaware | 11 |
| District of Columbia | 89 |
| Florida | 140 |
| Georgia | 636 |
| Illinois | 81 |
| Indiana | 42 |
| Iowa | 26 |
| Kansas | 18 |
| Kentucky | 22 |
| Louisiana | 49 |
| Maine | 4 |
| Maryland | 141 |
| Massachusetts | 52 |
| Michigan | 52 |
| Minnesota | 35 |
| Mississippi | 27 |
| Missouri | 26 |
| Montana | 2 |
| Nebraska | 11 |
| New Hampshire | 4 |
| New Jersey | 56 |
| New Mexico | 8 |
| New York | 180 |
| North Carolina | 98 |
| North Dakota | 1 |
| Ohio | 79 |
| Oklahoma | 24 |
| Oregon | 1 |
| Pennsylvania | 81 |
| Rhode Island | 6 |
| South Carolina | 51 |
| South Dakota | 1 |
| Tennessee | 125 |
| Texas | 62 |
| Utah | 7 |
| Vermont | 3 |
| Virginia | 62 |
| Washington | 10 |
| West Virginia | 9 |
| Wisconsin | 36 |
| Wyoming | 3 |
| Total, continental U.S. | 2564 |
| Alaska | 1 |
| Canada | 41 |
| Colombia | 3 |
| Costa Rica | 2 |
| Cuba | 1 |
| Egypt | 1 |
| Germany | 1 |
| Guatemala | 1 |
| Holland | 1 |
| Honduras | 1 |
| India | 2 |
| Iran | 1 |
| Japan | 1 |
| Korea | 1 |
| Mexico | 5 |
| New Zealand | 1 |
| Philippines | 1 |
| Portugal | 1 |
| Puerto Rico | 5 |
| Thailand | 1 |
| Total, territorial and foreign | 72 |
| Total paid registrations | 2636 |

### AAAS Business Sessions

As required by the constitution, the Association's board of directors held its fourth regular meeting of the year at the annual meeting; as usual, its sessions preceded the two sessions of the Council, which are reported elsewhere. The AAAS section officers luncheon and business meeting held at the Central YMCA was well attended. There was considerable thoughtful discussion on the perennial problem of too many excellent symposia in potential conflict with one another, which will be conveyed to the standing Committee on AAAS Meetings.

### Attendance

The second Atlanta meeting was average in size for the past 10 years, which, in terms of the region in which it was held, means it was (i) larger than any other AAAS meeting in the South and (ii) larger than any other scientific meeting in the South. It was strongly supported by southern scientists and teachers. Of the 2636 paid registrants, 1565, or 59 percent, came from 15 southern states, led by Georgia with 636. Considering the still relatively low population of scientists in this geographically large region, this is a high figure indeed. It was also a great national meeting with an excellent international representation. As Table 3 shows, every state in the Union,

except Idaho and Nevada, was represented and, among the 18 foreign countries represented, there were 41 delegates from Canada and five from Mexico.

For those interested in comparisons, the 1941 meeting in Dallas had 1851 paid registrants. The 1938 meeting in Richmond, which is still remembered as jamming that city, had 2553 paid registrants. In both of these years, the botanical societies, the horticulturists, the geneticists, the American Society of Zoologists, and other societies—none of whom held their 1955 meetings with the Association in Atlanta—met with the AAAS and contributed perhaps two-thirds of the attendance. Undoubtedly, as Table 4 suggests, all of these societies, however, were represented by some of their members.

The *total attendance* of professional scientists, faculty members, other teachers, and graduate students at any national meeting of the Association is always greater than the number of paid registrations, since all programs are open to everyone. At Atlanta, the percentage of AAAS registrations by members of societies maintaining separate registrations was higher than usual—but undoubtedly there were some who regarded a "double registration" as superfluous or onerous. In one sense these persons are registrants, but they are anonymous as far as the AAAS registration records are concerned and cannot be included.

The 122 representatives of the press, many of whom attended sessions at Atlanta, were issued complimentary badges and naturally are not included as paid registrants in Table 4. Similarly, several hundred exhibitor personnel, most of them with individual scientific interests, were issued complimentary badges, and these too are not included. With the attendance at the annual illustrated lecture of the National Geographic Society considered, in addition to the figures shown in Table 4, the press, and exhibitors, it may be conservatively estimated that more than 5000 persons attended some phase of the second Atlanta meeting.

Those who are statistically minded or under the impression that the annual meetings of the Association are falling off in numbers will be interested to learn that only ten of the 122 AAAS meetings so far have had more than 3000 paid registrations. Three of these were in 1951, 1953, and 1954, subsequent to the September campus meetings of the AIBS which began in 1950.

## AAAS Public Information Service

Those who visited the AAAS press room in the Dinkler Plaza Hotel gained some impression of the efficient way in which reporters covering the meeting were provided with nontechnical abstracts and complete copies of papers by Sidney S. Negus, the Association's director of public information, whose full-time job the rest of the year is chairman of the department of biochemistry, Medical College of Virginia, Richmond. Negus reports as follows:

"One hundred twenty-two reporters representing the press, radio, and television, registered in the press room at Atlanta. Forty-six other individuals from the United States and abroad reported the meeting from nontechnical abstracts and papers mailed to them. All American and several foreign wire services and leading news magazines were represented. Coverage by the Atlanta newspapers and broadcasting stations was exceptionally good. Governor Griffin's 'Science Week in Georgia' proclamation was especially appreciated. News stories concerning the meeting were distributed widely outside Atlanta, since the wire services and Western Union filed approximately 110,000 words. Many of these wire reports were relayed to news outlets in every country on the globe for millions to read. Clippings have already been received from England, Italy, Israel, and India. In addition, many pictures taken in Atlanta during the week were received by wire in newspapers and magazine offices everywhere.

"The public information service for a large diversified scientific meeting like the annual AAAS one has to be set up months ahead of time. For the Atlanta meeting, a strong local committee on public information was appointed last summer to help set the stage in Atlanta for this complex operation. It was composed of 14 members and was headed by George C. Biggers, Sr., president of Atlanta Newspapers, Inc. Odom Fanning, then head of publications services for the Georgia Institute of Technology Engineering Experiment Station, was the first executive secretary of this committee and was especially helpful. In October, when Fanning was appointed manager of information services for the Midwest Research Institute in Kansas City, George M. Stenhouse, information officer of the Communicable Disease Center, U.S. Public Health Service, Atlanta, took over as secretary. Thanks largely to Fanning, Stenhouse and his assistant, Wallace Richter, and other members of the local committee, every detail on a local level was taken care of perfectly.

"The secretaries and program chairmen of the 17 AAAS sections meeting in Atlanta and those of the 68 participating societies cooperated fully in getting to me early copies of their programs. Subsequently, letters were sent to each author asking for 100 copies of a nontechnical abstract of his paper. Complete copies of exceptionally newsworthy papers were solicited from approximately 300 authors. The response to this appeal becomes better each year, indicating that scientists are becoming more and more willing to cooperate with the press in letting the general public, which directly or indirectly pays for scientific research, know in a dignified and accurate way what they are accomplishing. The Association's officers and staff were helpful in many ways.

"Active members of the National Association of Science Writers and other reporters in the United States and abroad were then sent a list of 90 apparently newsworthy highlights of the meeting and were asked whether they wanted programs and advance copies of abstracts

Table 4. Attendance by subject fields.

| Subject field | Paid registrants | Complimentary admissions to exhibits |
|---|---|---|
| Mathematics and statistics | 35 | 14 |
| Physical sciences | | |
| Physics | 129 | 160 |
| Meteorology | 23 | 0 |
| Astronomy | 16 | 59 |
| Chemistry | 146 | 76 |
| Geology and geography | 61 | 17 |
| Engineering and industrial science | 56 | 176 |
| Biological sciences | | |
| Plant pathology and mycology | 394 | 4 |
| Other botanical sciences | 98 | 5 |
| Ecology and limnology | 37 | 0 |
| Genetics and cytology | 36 | 2 |
| Microbiology | 21 | 0 |
| Parasitology | 179 | 2 |
| Zoological sciences | 210 | 17 |
| Biology (in general, and other) | 193 | 47 |
| Agricultural sciences | 66 | 19 |
| Medical sciences | | |
| Bacteriology and virology | 21 | 4 |
| Biochemistry and nutrition | 72 | 3 |
| Physiology | 53 | 1 |
| Psychiatry | 30 | 1 |
| Dental research | 22 | 2 |
| Pharmacy and pharmacology | 51 | 3 |
| Medicine (in general, and other) | 106 | 72 |
| Psychology | 94 | 18 |
| Economic and social sciences | 19 | 30 |
| History and philosophy of science | 25 | 10 |
| Science teaching and education | 138 | 70 |
| Scientific editorial problems | 42 | 0 |
| General interest in science | 87 | 625 |
| No field indicated | 176 | 97 |
| Total | 2636 | 1534 |

and complete papers. The response, as usual, was exceptionally good, with the final results that are pointed out in the first paragraph of this report.

"In late September, Winifred Lee Wilkinson was selected to be in charge of all radio and television programs for the Atlanta meeting. She handled this assignment in superior fashion, setting up 28 radio and television programs on public service time. Several of these programs were broadcast coast to coast.

"On the first evening of the meeting, Ambassador Abba Eban entertained the press and others at a reception incident to the opening of the exhibit, 'Science in Israel.' On succeeding evenings, NASW members and other representatives of the press, radio, and television, in and outside Atlanta, were entertained by Blake R. Van Leer and Goodrich C. White, presidents of Georgia Institute of Technology and Emory University, respectively, and by the A. H. Robins Company of Richmond, Va. Robert B. Wallace, Jr., present head of publications services at Georgia Tech, and Frank Ashmore, of the public relations department at Emory University, took care of the many details having to do with their president's dinner party, and Dorothy Noyes, of Noyes and Sproul, Inc., New York, and John E. Norton, of A. H. Robins Company, made arrangements for the Robins party. Fresh orange juice was served continuously in the press room for the 5 days of the meeting by the Florida Citrus Commission (A. W. Hines), with the assistance of Eastern Airline hostesses. Sandwiches and coffee were served the press each day by the General Motors Corporation (Philip G. Rozelle), the General Electric Company (Harry Backer), the American Tobacco Company Research Laboratory (H. R. Hanmer), and the Georgia Power Company (Joseph Kling).

"General Motors, General Electric, and the Southern Bell Telephone and Telegraph Company (Murray C. Fincher) contributed secretarial help for the press room during the meeting—Mary Ewing, Mickey Whitmore, and Joan Neville. The Atlanta Area Council, Boy Scouts of America (O. B. Gorman, Scout Executive), selected one of its top-ranking Eagle Scouts to be chief messenger in the press room. James S. Kelley, 16 years old, and an honor student at the Westminister School in Atlanta, enjoyed an interesting experience especially since he is preparing himself for either a medical career or one in scientific research. As usual, the General Electric Company Research Laboratory (Miles J. Martin, Ned Landon, and Paul Heinmiller) held open house every evening in a suite in the Dinkler Plaza. The Association's public information service is grateful to these individuals and organizations for helping to make the meeting so enjoyable for representatives of the press, radio, and television covering the convention.

Seymour S. Cohen (left), winner of the 1955 Newcomb Cleveland award, receives the award check of $1000 from Dael Wolfle (right), executive officer of AAAS. The announcement of the winner and presentation of the award were made 30 Dec. in Atlanta, Ga., just preceding the Phi Beta Kappa lecture by Lawrence M. Gould, president of Carleton College. [Photo by Ken Patterson, *Atlanta Journal-Constitution*]

"Besides handling public information for the Atlanta meeting as an intermediary between authors of papers and reporters, this department sent informational material about the Association directly to various individuals throughout the country and especially in the Southeast. Background material and highlights of the meeting were sent to approximately 400 high-school principals in Georgia, to all civic club secretaries, to members of the Atlanta chapter of the Public Relations Society of America, to 150 managing editors and 150 city editors of leading American newspapers, to some 385 editors of daily and weekly newspapers in Georgia, to 350 prominent citizens in the Southeast, to 300 public information officers of colleges, government agencies, and industries having representatives on the program, to secretaries of the 41 academies of science, and to 50 news directors of leading radio and television stations.

"Associates in the press room at Atlanta were Thelma C. Heatwole, Staunton, Va., Foley F. Smith, Richmond, Va., and Irving Telling, of Arthur D. Little, Inc., Cambridge, Mass., with Wayne Taylor of Austin, Texas, in charge of photography. These individuals and the four other press room assistants already mentioned were of invaluable aid in getting material quickly to reporters to whom, more than to any others, goes the credit for helping to make possible one of the four principal objectives of the AAAS—to increase public understanding and appreciation of the importance and promise of the methods of science in human progress."

## AAAS Science Theatre

The Science Theatre, which shows a selection of the latest foreign and domestic scientific films, was inaugurated at the Chicago meeting of 1947. It is now an established feature of the annual meetings of the Association. At Atlanta the theatre was located on the stage of the Municipal Auditorium, in proximity to the Annual Exposition of Science and Industry, but screened from the exhibit area by a heavy velvet curtain. It was reached by passing through the exhibits. For the seven programs given during the week, the 300 chairs were well filled by ever-changing audiences. Many came to see a particular film and stayed for several more. The thirty-nine different films listed in the General Program-Directory were shown, in most cases, more than once. To these were added the following films, which were received later: *Smog*, Air Pollution Foundation, Los Angeles, Calif.; *The Golden Leaf*, American Tobacco Company; *Mining for Nickel*, In-

ternational Nickel Company, Inc.; and *The Rocket,* British Information Services. The Association again expresses its appreciation to those who so kindly lent such excellent subjects.

### Annual Exposition of Science and Industry

The 1955 Annual Exposition of Science and Industry filled the large horseshoe-shaped arena of the Municipal Auditorium. In most cases, the exhibitors were pleased with the interest shown by the attendance. Because of a scheduled athletic event on the evening of 23 Dec. and the holidays, the erection of booths by the Shepard Decorating Company did not begin until early on the morning of 26 Dec. By noontime, however, it was possible for many of the exhibitors to begin installation of their exhibits. In the arena, there were 92 booths; in nearby Taft Hall, the Embassy of Israel presented for the first time in this country an exhibit of the work of the leading scientific institutions in Israel; this exhibit occupied space equivalent to that of 30 booths.

The names of most of the 66 exhibitors and descriptions of their exhibits appeared both in the General Program-Directory and in the preconvention issue of *Science*. Those that did not are listed here: American Red Cross, Georgia Chapter; Atlanta Publishing Company; Communicable Disease Center, USPHS; Computer Center, Georgia Institute of Technology; Georgia Power Company; Georgia State Department of Public Health; International Geophysical Year; National Cancer Institute; J. C. Nichols (living salamanders); Southern Bell Telephone and Telegraph Company; United Nations.

The Science Library had some 500 volumes from 37 publishers. As in past years, the Association is indebted to the Special Libraries Association, this time the Georgia Chapter, for supervising the Science Library.

### Work of the Atlanta Committees

In his report of the AAAS Public Information Service, Negus commends the able work of the local committee on public relations headed by George C. Biggers, Sr., president, Atlanta Newspapers, Inc. All members of the Association are indebted for the varied and effective services of each member. An attractive window display on atomic energy and a welcome to AAAS delegates were suggested by Julian Trivers, vice president, the Davison-Paxon Company.

The Association and all who attended the 122nd meeting are much indebted for the excellent appointments and wise counsel of James V. Carmichael, president of Scripto, Incorporated, and general chairman of the Atlanta meeting, who had kept in close touch with all developments since the spring of 1954. Until the last minute, when it proved impossible, he had expected to be present at the AAAS presidential address and reception. His place there and at the opening ceremonies of the Embassy of Israel exhibit was filled by the general vice chairman, Robert S. Lynch, president, Atlantic Steel Company. Bradford D. Ansley, of the Trustees Committee on Development, Emory University, served as executive secretary of the Atlanta committees. Despite his many professional duties, he devoted considerable time to coordinating local activities and solving problems as they arose, assisted by his secretary, Anne Cain.

The Atlanta Committee on Physical Arrangements, headed by Walter S. Bell of the department of audio visual education, Atlanta Board of Education, proved to be one of the most efficient, hard-working, and economical committees responsible for projection and other equipment that the Association has ever had. Not only did Bell and his colleagues supply every lantern, screen, and volunteer operator requested and check the chairing and darkening of each room, but they took care of the Science Theatre and stood by for emergency requests for anything from a thumbtack to a tape recorder, complete with operator and typist. The Association gratefully acknowledges the work of this committee.

The Exhibits Committee, under the chairmanship of D. J. Haughton, vice president and general manager, Lockheed Aircraft Corporation, Georgia Division, canvassed local and regional industry and secured exhibitors that otherwise would not have been present. The Association is particularly indebted to R. R. Kearton, assistant general manager of Lockheed, who devoted considerable personal time and thought to this phase of the financing of the meeting. The members of the Finance Committee, with Fred J. Turner, president, Southern Bell Telephone and Telegraph Company, as chairman, helped greatly to reduce the deficit of the meeting. Firms that endowed booth space for nonprofit exhibits or made outright contributions include:

American Bakeries Company
Associated Industries of Georgia
Atlanta Coca-Cola Bottling Company
Atlanta Envelope Company
Atlanta Stove Works
Atlanta Transit System
Atlantic Steel Company
Auto-Soler Company
Barge-Thompson Company
Cabin Crafts, Inc.
Chicopee Mills, Inc.
Citizens & Southern National Bank
Colonial Stores, Inc.
Cotton Manufacturers Association of Georgia
Embassy of Israel
First National Bank of Atlanta
Fulton National Bank
Ford Motor Company, Atlanta Assembly Plant
George Muse Clothing Company
Georgia Power Company
Georgia State Chamber of Commerce
Georgia State College of Business Administration
Gulf Oil Corporation, Atlanta Sales Division
Ivan Allen Company, Office Equipment
Irvindale Dairies
MacDougald-Warren, Inc.
Merrill Lynch, Pierce, Fenner & Beane
Plantation Pipe Line Company
Rich's, Inc.
Scripto, Incorporated
Sears, Roebuck and Company
Southern Bell Telephone and Telegraph Company
The Bank of Georgia
Trust Company of Georgia

To these should be added a contribution made for the third time by the United-Carr Fastener Corporation of Cambridge, Mass., to the AAAS for any worthy purpose and applied to the second Atlanta meeting.

Walter E. Crawford, executive vice president of the Atlanta Convention Bureau, provided much personal assistance and friendly help prior to, and throughout, the meeting.

To all those named, and to those who volunteered their services for clerical assistance in the AAAS office in the Municipal Auditorium, and to all who made contributions, the Association expresses its deep appreciation. The whole experience in Atlanta with so many courtesies and instances of cooperation was a heartwarming and memorable one.

### Awards and Prize Winners

The following annual awards were made during the meeting: 28th AAAS Newcomb Cleveland prize, to Seymour S. Cohen, professor of biochemistry, University of Pennsylvania [*Science* **123**, 54 (1956)]; 11th AAAS Theobald Smith Award in the Medical Sciences, to Robert A. Good, American Legion heart research professor, University of Minnesota Medical School [*Science* **122**, 1261 (1955)]; 1st AAAS–Anne Frankel Rosenthal Memorial Award for Cancer Research, to Lloyd W. Law, head, leukemia

studies section, laboratory of biology, National Cancer Institute [*Science* **123**, 20 (1956)]; 2nd AAAS Socio-Psychological prize, to Yehudi A. Cohen, department of psychiatry, Albert Einstein College of Medicine [*Science* **122**, 1261 (1955)]; Scientific Research Society of America–William Procter prize, to Robert R. Williams, chairman, Williams-Waterman Fund for the Combat of Dietary Diseases, Research Corporation [*Science* **122**, 1262 (1955)]; John Scott award, administered by City of Philadelphia Board of Directors of City Trusts, to Edgar S. McFadden, agronomist, Texas Agricultural Experiment Station [*Science* **122**, 1262 (1955)]. (Dr. McFadden died 5 Jan.)

# Reports of Sections and Societies, Atlanta Meeting

## Physics (Section B)

J. H. Howie as chairman of the local program committee arranged a full and diverse program. On Tuesday afternoon there was a symposium on radiation measurements, with F. L. Mohler presiding. The program included, "Radioisotope measurements in clinical diagnosis" by Marshall Brucer (Oak Ridge), "A medical spectrometer" by Jack Francis (Oak Ridge), and "Fallout measurements" by J. H. Tolan (Georgia Tech).

On Wednesday afternoon there was a symposium on research progress in physics, with Clifford Beck presiding. G. L. Pearson (Bell Telephone Laboratories) described experiments being carried out at the Savannah River Plant to detect neutrinos in the radiation emitted by a high flux reactor. The experiments involved a large volume of radiation-sensitive liquid surrounded by a battery of scintillation counters. There is reason to hope that this elusive elementary particle may at last be observed and measured. Arthur E. Ruark (University of Alabama) described a search for rare particles involving refinements in cloud-chamber techniques. Charles E. Falk (Brookhaven) gave a talk on super-energy accelerators. He described existing accelerators and gave in some detail the plans for the 30-Bev proton synchrotron that is under construction at Brookhaven.

Following a AAAS session on "The crisis in science education," there was, on Thursday afternoon, a symposium on training for careers in physics with Alan T. Waterman presiding. Gerald A. Rosselot (Bendix Corporation), Clifford A. Beck (North Carolina State College), and Josiah Crudup (Brenau College) spoke on careers in industry, scientific research, and education, respectively.

On Friday afternoon, there was a report on the International Conference on Peaceful Uses of Atomic Energy. Detlev Bronk presided, and Clarence E. Larson reviewed the program on the physical sciences, while Shields Warren covered the biological and medical sciences.

There were many other programs of interest to physicists. The American Meteorological Society held a session of miscellaneous contributed papers. There were three sessions on the program for the International Geophysical Year, which attracted large audiences because of the broad scope of scientific research included in this program. The Oak Ridge Institute of Nuclear Studies held a symposium on "Atomic energy and agriculture." There were three sessions on plant and animal metabolism and one on food sterilization.

Section B was cosponsor of a session on the role of physics in premedical education. On Wednesday evening, Section B and Sigma Pi Sigma held an informal dinner for physicists.

FRED L. MOHLER, *Secretary*

## Chemistry (Section C)

Those who had the opportunity to attend the AAAS meeting in Atlanta will without doubt report that it was a very good meeting for it gave them the opportunity (i) to acquire new knowledge in their fields of specialization as well as in other areas of science, (ii) to broaden their acquaintance with other scientists, and (iii) to renew acquaintance with fellow-workers in other regions of the country.

Of special interest to chemists were the programs of Section C (Chemistry), the chemists' dinner meeting, a number of the special AAAS symposia, the variety of displays in the exhibit hall, and the interesting programs of the Science Theatre.

The program of Section C included nine sessions, some of which were cosponsored by other sections and by the Georgia Section of the American Chemical Society. One session consisted of contributed papers on a variety of topics, such as the effect of steric factors on the pinacol rearrangement, crystal engineering, the assay of folic acid by a thermophylic bacillus, the *in vitro* action of certain enzyme inhibitors on the blood-clotting mechanism, studies with labeled microbes, and the toxicity of chemicals to marine borers.

Two sessions, arranged by Jules S. Cass, presented recent studies on the patterns of biochemical and histological responses to clinical agents.

One session, arranged by LeRoy A. Woodward, considered the sedimentary kaolins along the southeastern fall line in a series of six papers, and another session, presided over by Wallace R. Brode, heard the annual address of the Scientific Research Society of America and award of the William Procter prize.

Two sessions, arranged by Ellison H. Taylor, were on radiation chemistry and related fields, consisting of a historical introduction, an outline of currently accepted views, and the role of radiation chemistry in radiobiology.

At the dinner meeting, presided over by Eugene P. Cofield, the vice president's address on the chlorination of water by Robert S. Ingols proved to be both interesting and informative.

The final session, arranged by Detlev W. Bronk, consisted of a report on the International Conference on Peaceful Uses of Atomic Energy, with papers by Clarence E. Larson on the physical sciences and by Shields Warren on the biological and medical sciences.

Karl Folkers, chairman of Section C for 1956, has already initiated work on the program for the New York meeting. Now is the time to begin to plan for this meeting. Submitted papers should be sent to Folkers or to Ed. F. Degering, 26 Robinhood Road, Natick, Mass., on or before 1 Sept., 1956.

EDWARD F. DEGERING, *Secretary*

### American Association of Clinical Chemists (C2)

The program of the American Association of Clinical Chemists was opened by a symposium, "Recent concepts in clinical chemistry," 26 Dec. This symposium was devoted to the role of the clinical chemist in the hospital and some aspects of recent developments in acid-base balance, lipid metabolism, and blood proteins. Clinical chemistry was defined as the study of the nature of the chemical reactions of the body and the application of this knowledge as an aid in determining the state of well-being and the management of the ill. Speakers for this session were Albert E. Sobel, Joseph H. Gast, Samuel Natelson, D. B. Zilversmit, and Henry G. Kunkel.

At a dinner on Monday evening, an informal discussion of the forthcoming International Congress of Clinical Chemistry to be held in the Hotel New Yorker in New York, 9–14 Sept. 1956, under the sponsorship of the AACC and the announcement of the officers of the congress highlighted the evening. The tentative program of the congress follows: 9 Sept., registration; 10 Sept., scientific session and general mixer; 11 Sept., scientific session and banquet; 12 Sept., all-day outing; 13 Sept., scientific session; 14 Sept., closing session (ending at noon). The congress officers are chairman, Albert E. Sobel; secretary, John G. Reinhold; chairman of scientific program, Harry Sobotka; chairman of scientific exhibits, Charles G. Fox, Jr.; chairman of news service, Joseph Samachson; hospitality and housing committee, Metropolitan New York Section, AACC, chairmen, Harry Goldenberg and Julius Carr, secretary, A. Saifer.

The Tuesday morning session consisted of contributed papers on analytic methods. The use of infrared spectroscopy in clinical chemistry was discussed by D. Beischer, who pointed out the value of this basic tool in diagnostic problems as well as in research. An ultramicro method for the determination of proteins in biological fluids and a number of other interesting papers were presented. The Tuesday afternoon session consisted of contributed papers on metabolism and analytic methods.

ALBERT E. SOBEL, *Program Chairman*

### Astronomy (Section D)

Section D had a varied and interesting program, which took place on two afternoons and two evenings. Mornings were left open so as not to conflict with the IGY sessions.

The first afternoon was devoted to a program of four papers by members of the Astronomical League, national organization of amateur societies. Illness prevented Fred L. Whipple from giving his lecture on "Progress in meteor astronomy." In its place Gerald M. Clemence made some brief remarks about the International Astronomical Union, and the secretary showed kodachromes taken on his trip to the recent meeting in Dublin.

The second afternoon was devoted to a program of five papers. Highlight of this session was the report by A. E. Lilley and E. F. McClain (Naval Research Laboratory) that they have been able to measure the red shift of the colliding galaxies in Cygnus A, using the 21-centimeter line of hydrogen in absorption. Their value is in excellent agreement with the result obtained with the 200-inch telescope.

The retiring vice president and chairman of Section D, Clemence, gave his address "Standards of time and frequency" on the evening of 29 Dec. The audience made up in appreciation for what it lacked in numbers. This outstanding address will appear in a forthcoming issue of *Science*.

The program of Section D was concluded with a popular lecture, "Exploring the Milky Way," by the secretary at a meeting of the Atlanta Astronomy Club on the evening of 30 Dec. This was held at the Bradley Observatory of Agnes Scott College in Decatur.

FRANK K. EDMONDSON, *Secretary*

### Astronomical League (D1)

Frank K. Edmondson showed and commented on colored pictures taken on his visits to astronomical installations on the Continent, in England, and in Ireland during the summer of 1955, when he attended the meeting of the International Astronomical Union in Dublin. This feature proved to be of great interest to everyone.

Other highlights of the session were provided by R. R. LaPelle's demonstration of the effectiveness of astronomy in motivating the study of science, and by Berry O. Pyron's report on the quantity and the sources of the meteoritic dust arriving daily on the surface of our planet.

CHANDLER H. HOLTON, *Treasurer*

### Atlanta Astronomy Club (D2)

After a short business session, members of the Atlanta Astronomy Club, convention delegates, and visitors heard an excellent address on "Exploring the Milky Way" by Frank K. Edmondson (Goethe Link Observatory, Indiana University). By skillful explanation and well-selected slides, Edmondson portrayed the methods of study and the present conception of the form and the spiral structure of our galaxy.

Later W. A. Calder's planetarium and the 30-inch reflector of Bradley Observatory were enjoyed by many, although a bright moon hampered observation. Refreshments were served by the Atlanta Astronomy Club.

CHANDLER H. HOLTON, *Treasurer*

### Geology and Geography (Section E)

Two sessions were devoted to papers on geology and geography. A symposium on "Military geology" was also held. This symposium was arranged by Frank C. Whitmore, Jr., of the U.S. Geological Survey. All of the papers were by scientists in Government agencies. W. H. Grant led a field trip to the crystalline rocks near Atlanta. Wallace M. Atwood, Jr., gave the vice-presidential address on the subject of "United States participation in international science."

ROBERT L. NICHOLS, *Secretary*

### National Speleological Society (E4)

Thomas C. Barr (Vanderbilt University) reported on the development and morphology of caves in the Cumberland Plateau area of Tennessee. Barr described the work that he and others have been doing in conjunction with the Tennessee Geological Survey. Accompanying his talk was a series of remarkable color slides showing some of the vast caves in Tennessee, particularly the famous Higginbottom Cave.

Charles E. Mohr (Audubon Nature Center, Greenwich, Conn.), who was also the presiding officer at the morning session, delivered a paper on the uses of photography as an aid to speleological research. Mohr emphasized the importance of cave conservation and the way in which records of cave species and various cave minerals can be more easily studied by photographs than be removing specimens from the caves.

The final paper dealt with a report of the investigations that the Speleological Society has been conducting at Floyd Collins Crystal Cave in Kentucky. As a result of the exploration and mapping of this cave system by members of the society,

it has been demonstrated that it is the largest in the world and that it has 32 miles of mapped passages.

In the afternoon a symposium on the distribution and speciation of cave vertebrates was held with the Herpetologists League. The report of this session will be found in their report.

BROTHER G. NICHOLAS,
*Program Chairman*

## Zoological Sciences (Section F)

The 1955 Atlanta meeting presented a stimulating and varied program in the zoological sciences. That portion of it specifically arranged under the auspices of Section F consisted of three classified sessions of contributed papers and a symposium in two sessions. The contributed papers were divided between a Monday afternoon session devoted to ecology and radiobiology with seven papers presented, a Tuesday afternoon session on physiology with six papers, and a Wednesday morning session devoted briefly to protozoology and genetics with 12 papers. The attendance at these sessions fluctuated greatly, depending on the number of competing meetings, being about 40 at the first session, varying between 25 and 6 on Tuesday afternoon, and rising to 40 on Wednesday morning.

The symposium on the "Formation and early development of the embryo" consisted of eight invited papers presented in two sessions on Tuesday morning and Tuesday afternoon. Unfortunately two of these papers, one at each session, had to be omitted because of illness of the authors. This program was built about a theme of importance not previously treated in a general symposium, and the arrangers, R. C. von Borstel, D. B. Metz, and A. Tyler deserve special commendation for imaginative treatment of the theme through their invited speakers. The attendance at the two sessions of the symposium varied between 40 and 100.

Of the excellent symposia planned by other groups, the one that received the most attention by the biologists in attendance was that on the "Species Problem," planned by the Southeastern Biologists and arranged by E. Mayr. It was an extensive and valuable series of papers with new viewpoints on a perennial central theme. The four-session symposium presented by Section N on "Microbiology and medical research" also attracted many biologists, since it presented summaries of much new material on microbiology, physiology, and virus research. This program deserves special commendation since it was presented from exactly the viewpoint suggested by the Arden House memorandum.

The dinner meeting of Section F was held at Atlanta University on Thursday evening. About 70 members enjoyed the dinner. The talk by E. Gordon Carlson on "Mitotic movements of chromosomes" was a valuable summary of his important studies.

Nearly all biologists agreed that this was an important meeting scientifically, even though the total attendance was small. Most agreed that meetings should be held in the South in spite of some difficulties. Many expressed the belief that contributed papers might be omitted in the future but hoped there might be some method for submitting abstracts listed by title.

H. H. PLOUGH, *Secretary*

## American Society of Parasitologists (F1)

The meeting of the American Society of Parasitologists, consisting of seven sessions for the presentation of papers and discussion, one session for demonstrations, one session for the presentation of the presidential address, and one session for the annual business meeting, was carried out without deviation from the printed program. Of the 133 papers represented, only two did not materialize. The outstanding paper in the opinion of many was presented by C. P. Read of Johns Hopkins University entitled "Comparative studies on the physiology of trichomonad flagellates."

The average attendance at the various sessions was more than 100, and 140 were at the annual luncheon and business meeting. The only items of business other than routine matters pertaining to efficient running of the society were connected with the selection of a new editorial committee to carry on the work of the *Journal of Parasitology*, with the election of Leon Jacobs of the NIH as the new chairman and Harold Manter of the University of Nebraska and Bernard Travis of Cornell University as associates on the new committee that is to serve through 1960.

A. C. WALTON, *Secretary*

## Society of Systematic Zoology (F4)

The 8th annual meeting of the society included a full program, carefully planned to coordinate with other biological programs scheduled at the same time.

As usual, activities centered in the book lounge, where the books on zoology of 90 publishers were on exhibit—virtually a complete set of the books about animals (including biological textbooks) that are in print in America. More than 800 books were in the collection.

In addition to sessions for contributed papers, the annual business meeting, and meetings of the council, the program included a symposium on "The systematic content of general biology courses," the annual breakfast, a tea in the book lounge, and cosponsorship of sessions arranged by other societies.

It was decided to hold the 1956 annual meeting with the AAAS in New York.

R. E. BLACKWELDER, *Secretary*

## Mountain Lake Biological Station (FG5)

Former staff members, investigators, and students met for breakfast on 29 Dec. The 51 persons present represented everyone of the 26 years the station has been in operation. Each was introduced and given an opportunity to say a few words. George Sprugel, Jr. (National Science Foundation) announced an NSF grant of $18,000 for the promotion of research at the station during the years 1956, 1957, and 1958. Raymond L. Taylor (AAAS) described briefly the noncredit seminar course on organized science that he will conduct there during the coming summer. Several speakers from national scientific organizations will participate in these discussions.

BRUCE D. REYNOLDS, *Director*

## National Association of Biology Teachers (FG6)

The National Association of Biology Teachers sponsored one joint session cosponsored by ANSS and NSTA based on the theme "Science and human resources." Varied topics covered the influence of science on the South, practical methods of introducing radioisotopes to the high-school student, and the problems faced by Negro colleges in their efforts to prepare science teachers.

Two separate programs were planned by NABT. One stressed the coordination of science and education. Variations in teaching biological principles were demonstrated, summer programs for the biology teacher were outlined, and progress reports resulting from the recommendations of the Gainesville Conference on Biology Teaching were given by representatives from ten southern states. The reports showed that the recommendations of the conference, sponsored by NSF and carried out by NABT, were being undertaken by a majority of the states represented.

The second session was centered around the presentation of new ideas to

the biology teacher. These consisted of an illustrated demonstration of techniques for growing fern spores, the teaching values of animals and plants in the laboratory and the field, better use of visual aids, and the use of the project method of training teachers in the biological sciences.

NABT also cosponsored meetings with ANSS, NSTA, NARST, and AAAS.

Highlights of the business sessions were the plans for incorporation, plans for additional conferences on the improvement of biology teaching and the encouraging report made by the secretary-treasurer.

JOHN P. HARROLD, *President Elect*

### Botanical Sciences (Section G)

The program of Section G comprised several symposia and sessions for contributed papers, and the annual Botanists' dinner. Two symposia were concerned with two plants of major significance to southern agriculture: tobacco and cotton. The symposium on "The tobacco plant," at which Barry Commoner presided, included papers by W. G. Frankenburg, M. L. Zucker, H. H. Smith, and E. E. Clayton on various biological and biochemical problems encountered in studying this plant. The parallel symposium on "The cotton plant," under the chairmanship of James H. M. Henderson, included papers by Wayne C. Hall, Wanda K. Farr, S. G. Stephens, and J. T. Presley. A third symposium, sponsored by the Southern Section of the American Society of Plant Physiologists and arranged by Aubrey Naylor, discussed current work on algal physiology and biochemistry, with papers presented by L. Provasoli, W. B. Wilson, J. H. Ryther, and T. R. Rice.

A variety of short presentations were heard at two sessions for contributed papers. The symposium sessions were attended by about 50 persons; audiences at the sessions for contributed papers were somewhat smaller. For botanists the high point of the Atlanta meeting was the annual botanists' dinner. This took place at Atlanta University and was notable for the warm hospitality and excellent food provided by our hosts, the remarkable floral decorations arranged by the Georgia Botanical Society, and the memorable vice-presidential address. Our retiring vice president for Section G, L. H. Blinks, spoke on "Flora et fauna potomacensis," and reported on his experiences during a recent stay in the Potomac region. Blinks' incisive observations and his remarkable drawings were warmly appreciated by the nearly 80 botanists present. It is hoped that Blinks can be persuaded to publish this valuable contribution. Much of the success of the dinner was due to the energetic work of our local representative, Robert B. Platt (Emory University).

BARRY COMMONER, *Secretary*

### American Phytopathological Society (G1)

Some 500 members were in attendance at the meeting of the American Phytopathological Society. Nearly 200 papers were presented in addition to several invitational papers.

GLENN S. POUND, *Secretary*

### American Society of Plant Physiologists, Southern Section (G3)

The Southern Section of the American Society of Plant Physiologists sponsored a symposium, "Implications of current physiological and biochemical research on marine algae," cosponsored by Section G and the Botanical Society of America, Southeastern Section. The four papers read were uniformly excellent. At the session for contributed papers in plant physiology, joint with Section G, the preceding afternoon, the attendance of more than 100 participated actively in the discussions following each paper. Barry Commoner's paper was outstanding.

AUBREY W. NAYLOR, *Program Chairman*

### Psychology (Section I)

The program of Section I consisted of five sessions of invited papers and two of submitted papers. All sessions were cosponsored by the Southern Society for Philosophy and Psychology. Two groups of invited papers, one on "Sensory processes" arranged by John F. Hahn and a second on "Brain function" arranged by Harlow W. Ades, were cosponsored by the American Physiological Society.

The other sessions of invited papers included a review of the present status of military psychology arranged by Wilse B. Webb, a series of four papers on learning arranged by Stanford C. Ericksen, and a symposium on primate behavior arranged by Arthur J. Riopelle. Section I joined with Section L to cosponsor a symposium on creativity in science.

WILLIAM D. NEFF, *Secretary*

### Social and Economic Sciences (Section K)

Section K held two principal symposia at Atlanta. The first was on "Contemporary patterns in southern population, migration, and urbanization." Papers were read by Homer L. Hitt (Louisiana State University) and Harlan W. Gilmore (Tulane University), the latter based on work in collaboration with Nicholas J. Demerath (Institute for Research in Social Science, University of North Carolina). Barnett O. Williams (University of Georgia) presided.

The second symposium was held jointly with the Southern Political Science Association on the subject of "Political trends in the South." Presentations were made by Lee S. Greene (University of Tennessee) and Jasper B. Shannon (University of Kentucky). Lynwood M. Holland (Emory University) presided.

Section K also cosponsored the session on "Some peaceful uses of atomic energy" with the National Academy of Economics and Political Science, the Oak Ridge Institute of Nuclear Studies, and with the collaboration of Pi Gamma Mu. Speakers at this session were W. Kenneth Davis (Atomic Energy Commission), Shields Warren (New England Deaconess Hospital), and Walker L. Cisler (Detroit Edison Company). Marshall Brucer (Oak Ridge Institute) presided.

A dinner meeting was held by Pi Gamma Mu preceding this session in honor of the speakers on the program of the National Academy of Economics and Political Science and the officers of Section K and the National Academy and also of the Oak Ridge Institute. Benjamin H. Williams (Industrial College of the Armed Forces) presided.

Other sessions in which Section K participated were "Resource development through science" with AAAS Sections P and M and the Southern Association of Science and Industry, and "Socio-economic aspects of orthopedic engineering" with AAAS Sections M and N.

DONALD P. RAY, *Secretary*

### History and Philosophy of Science (Section L)

The program of Section L opened on Wednesday afternoon with a symposium on "Sociology of science" arranged by the section secretary and presided over by Chauncey D. Leake. Participants were Philipp Frank, Harold K. Schilling, Paul B. Sears, and Philip Rieff. A section business meeting and luncheon were held Thursday noon, and we were fortunate to have Robert T. Lagemann (Vanderbilt University) as luncheon speaker. Thursday afternoon and evening Raymond J. Seeger presided over symposia that he had arranged on "Science and humanities" (participants were Harcourt Brown, David Hawkins, Raymond S. Stites, William D. Stahlman, and Philipp

Frank) and on "Creativity in science" (participants were Howard Hanson, W. F. G. Swann, and Samuel Eilenberg). The following groups acted as cosponsors for one or more of the symposia: AAAS Section I, Psychology; AAAS Section Q, Education; History of Science Society; Philosophy of Science Association; and the Southern Society for Philosophy and Psychology.

Contributed papers were presented on Friday morning and afternoon, and the final event of the Friday afternoon session was the presentation of Seeger's excellent vice-presidential address "Man and science." Seeger has contributed greatly to the development of the section, both as secretary and as chairman, and we hope that we shall continue to enjoy the benefits of his advice and his interest in the section.

JANE M. OPPENHEIMER, *Secretary*

## Society for the Advancement of General Systems Theory (L3)

A symposium, "Entropy," was devoted to the generalization of the entropy concept in irreversible thermodynamics and in information theory. According to the dictum of physics, the universe gradually "runs down," progressing toward states of increasing disorder and leveling down of differences. In contrast, the living world progresses, in individual development and in evolution, toward states of increasing order and heterogeneity. Ludwig von Bertalanffy outlined the advances made in the thermodynamics of irreversible processes, open systems, and steady states, which shed light on this apparent paradox as well as many other problems in physics and biology.

By posing new problems to "Maxie," the Maxwell demon, Anatol Rapoport discussed the questions of how far informational entropy presents a measure of organization and whether a conversion between thermodynamic and informational entropy is legitimate. W. Ross Ashby studied the experimenter and the system investigated as parts of a supersystem, from which unexpected features of the systems studied in science arise. Raoul S. Naroll showed that the principle of allometric growth applies to specialization in primitive tribes as well as to the process of urbanization in modern history, so that it may offer a quantitative measure for social developments.

The temporary committee of the society will continue its function until the election of officers, which will take place by mail ballot early in 1956. A further donation from the Bostrom Foundation, Inc., was gratefully acknowledged. *The Yearbook 1956 of the Society for the Advancement of General Systems Theory* will appear in the first half of 1956. It will contain a collection of papers applying GST in various fields, and will be mailed to the members free of costs.

LUDWIG VON BERTALANFFY, *Executive Secretary, pro tem*

## Engineering (Section M)

During the past year, Section M was pleased to welcome two additional technical societies as affiliated members of the section. They are American Institute of Industrial Engineers and National Society for Professional Engineers. These additions form a total of 21 technical societies now affiliated with Section M. Although the total membership in these societies is more than 150,000 engineers, there are only some 3000 engineers that are members of the Association.

One of the main problems of Section M is to develop a closer relationship between engineering and other divisions of science. We feel that the present practice of the annual meetings of the Association does not encourage the participation of the engineers in the activities of the Association. We recommend that serious consideration be given to more joint section meetings and that a greater emphasis be placed on meetings of the Association as a whole.

The engineering program for the 1956 New York meeting is being planned on the topic "Interrelationship of science and engineering," and we invite the cooperation of other sections of the Association in developing this program. Our program chairman will be Irving P. Orens (Newark College of Engineering, Newark, N.J.).

Section M is giving serious consideration to the development of a conference on engineering and science similar in organization and operation to the present Gordon Research Conferences in Chemistry.

Two meetings of the section committee were held in New York during the year. At these meetings, the administrative secretaries of the affiliated societies were invited to attend. The next meeting of the section committee is scheduled for 6 Mar. 1956 in room 1001 Engineering Societies Building, New York, N.Y., at 1 P.M.

At the Atlanta meeting, six sessions were developed in which 19 papers were presented. Two sessions were on "Automation;" two on "Resource development through science," and two on "Socioeconomic aspects of orthopedic engineering." Four sessions were held jointly with Section P, Industrial Sciences. The program was under the direction of Mario J. Goglia (Georgia Institute of Technology). The section presents its thanks to Goglia and his committee for the excellent program developed and for the hospitality extended to our visitors to Atlanta.

FRANK D. CARVIN, *Secretary*

## Medical Sciences (Section N)

Section N cosponsored several symposia with other AAAS sections and participating societies. The principal effort of the section, however, was the arrangement of a 2-day symposium on microbiology and medical research. S. E. Luria (University of Illinois), arranged the program. Each of the four sections was devoted to a different aspect of microbiological problems.

The first session was concerned with nutrition and microbiology. In this session, the nutritional responses of bacteria, viruses, animal microorganisms, and mammalian cells were discussed. Harry Eagle (National Institutes of Health), discussed current applications of tissue-culture techniques to the evaluation of potential cancer chemotherapeutic agents. He described media on which certain mammalian cells will grow, which are synthetic with the exception of a small amount of added serum, and presented evidence that would indicate that the serum did not contribute essential protein to the media.

The second session was concerned with problems of metabolism. S. S. Cohen (University of Pennsylvania), described metabolic changes in virus infections and presented interesting observations indicating that certain differences in virus nucleic acids may be accounted for on the basis of the number of the sugar moeities attached to the pyrimidine.

Session three was devoted to radiation effects on bacteria, viruses, and protozoans.

Session four was on infection and chemotherapy. During this session Luria gave his vice-presidential address on the subject "Infectious heredity and its medical applications." I. Tamm (Rockefeller Institute for Medical Research) discussed antiviral chemotherapy, presenting evidence that, although certain viruses can be adversely affected by chemical means, no potent antiviral therapeutic agents are as yet available. Very strong evidence was given, however, to indicate that this is a productive field for future investigations. During this session, the Theobald Smith Award for Medical Sciences was presented to Alan Good (University of Minnesota). Good presented a short résumé of the work for

which he received this recognition. His remarks were on the subject of congenital aglobulinaemia and the contribution such diseases offer in elaborating the mode of action of immunological mechanisms.

ALLAN D. BASS, *Secretary*

## American Association of Hospital Consultants (N2)

The symposium on "Place of experimentation in hospital administration" was held 29 Dec. with Jacque B. Norman (hospital consultant, Greenville, S.C.) presiding. Two formal papers were presented by E. M. Bluestone (consultant to Montefiore Hospital, New York) and E. Dwight Barnett (Columbia University). Discussants were John E. Gorrell (National Foundation for Infantile Paralysis) and Louis Block (Division of Hospital and Medical Facilities, U.S. Public Health Service).

The audience, although small, included representatives from the field of hospital administration, both government-owned and community hospitals, pathologists, the U.S. Public Health Service, state agencies administering the Hill-Burton program, schools of hospital administration, and industry.

Bluestone, in a paper on "Philosophic viewpoints on the role of experimentation in hospital administration," pointed out the need for research in the field of hospital administration and operation and brought out forcefully the existing gap between development of laboratory sciences and administrative applications. Bluestone's philosophy was that the two types of research should be carried on simultaneously and definitely correlated together. In this connection he said, "One of the most reprehensible forms of waste in the hospital is waste of clinical material. And just as medical research is a by-product of clinical bedside medicine, so administrative research is a by-product of the unsatisfactory routines that are ever on the minds of forward-looking and conscientious hospital executives."

Barnett, in his paper on "The practical viewpoint of the place of experimentation in hospital administration" cited a number of experimental and research programs that are being conducted today and commented on the value of each and the possible applications of the results obtained. He especially emphasized the large research program being conducted by Columbia University in the field of medical administration. His paper also brought out the need for research programs in this field.

Barnett brought out the possibilities of research for administrators of medical and health programs, possibilities that are unrecognized or undeveloped and could easily be undertaken. Barnett cited activities of the American Hospital Association and others some 4 or 5 years ago in trying to negotiate and start programs in hospital and medical administrative experiments and research. He pointed out the advantage that has come about with the appropriation from the Congress under Public Law 380 of $1.2 million for research in this field.

Both speakers stressed the need for tying in the social phase of health care into this research, pointing out that the ultimate result is better patient care and a higher health level of the community and the country as a whole.

JACQUE B. NORMAN, *Program Chairman*

## American Psychiatric Association (N4)

The 2-day meeting of the program of the American Psychiatric Association cosponsored by the American Physiological Society lived up to the formulation set for it. Not only were clinical advances in the new tranquilizing drugs presented on the first day but also basic studies on these drugs. On the second day the problem of alcoholism was presented from these two points of view. One of the highlights of the program was concerned with the mechanism of action of the new drugs. A spirited discussion took place on methods for screening of these new drugs in order to afford leads as to their probable clinical values. Various screening methods were compared and contrasted: condition reflexes on synaptic transmission, seizure latency on serotonin metabolism and on the contractions of the rat uterus.

The meeting on alcoholism discussed notable advances with the use of the tranquilizing drugs on the treatment of alcohol addition as well as rounded discussions of the various facets in the treatment of alcoholism. Again, as on the preceding day, fundamental mechanisms were stressed. Methods of alcohol oxidation, the effect of fructose in accelerating this oxidation, the pathway of alcohol metabolism in the body, the reciprocal influence of alcohol and the endocrine organs, and the action of alcohol on higher nervous activity were discussed. Taken all together this program presented the varied picture of progress occurring in the fields of psychiatry and alcoholism.

HAROLD E. HIMWICH, *Program Chairman*

## Dentistry (Section Nd)

Section Nd held two sessions on 28 Dec. Fifty people were present. Both sessions were devoted to 11 papers related to the physiology and secretory mechanism of saliva. The program was arranged by J. F. Volker of the University of Alabama.

C. E. Klapper (University of Alabama) reported studies in desalivated hamsters on a cariogenic diet. All developed caries and the teeth were destroyed in 45 days. When the submaxillary gland was not removed, the caries rate was reduced, indicating a protective effect of mucin.

A study of the secretory mechanism was reported by H. H. Chauncey (Tufts University). Various types of stimuli were applied to the parotid glands with resultant changes in salivary composition. Salivary depression produced a different constituent pattern.

L. Schneyer (University of Alabama) described methods of collecting the secretion of separate salivary glands. He found differences in the viscosity of various glands and estimated the flow in each. In a study of the submucous glands, he found that the flow was affected by the irritation of the collector device and concluded that under ordinary conditions these glands did not contribute appreciably to the total salivary flow.

J. Haldi (Emory University) measured the *p*H of tooth surfaces in desalivated white rats, using an antimony electrode, and compared it with caries activity. He found a definite relationship of both lowered *p*H and lactate to caries activity.

Donald B. Giddon (Tufts University) reported studies of changes in parotid secretion related to psychosomatic stress. Cholinesterase was used as the salivary criterion and comparisons were made to changes in pulse rates and blood pressure. In this study cholinesterase was found to be a better measure of autonomic changes than other available criteria.

From a study of the carbohydrates in saliva, W. Pigman (University of Alabama) found that the reducing power of whole saliva was greater than the sum of all gland secretions. By the use of chromatographic paper, he was unable to demonstrate the presence of sugar. By allowance for possible error of reagents, he estimated that there was not more than 1 milligram percent of glucose in saliva.

J. Reid (University of Alabama) reported electrophoretic and ultracentrifugal studies of human saliva. Individual gland secretions were tested, and differences between the constituent readings of the two methods were found.

W. E. Shafer (Indiana University) reported a study of the relationships between salivary and endocrine gland activity in rats. No relationship was found to the estrogenic cycle. Administration of sex hormones affected the salivary secretion and produced structural changes in the glands. Insulin had no effect, and the cortisones were slightly stimulating.

S. B. Barker (University of Alabama), in a study of thyroidectomized animals and of injections of thyroxin and related compounds, noted definite reactions in various tissues and organs, including the salivary glands.

W. Wynn (Emory University) reported studies of enamel solubility, using lactate buffer solutions. In partially decalcified enamel, he found that the magnesium and calcium carbonates had been removed but that the phosphate ions remained.

G. Hargreave (Tufts University) reported a study of 2500 compounds for glycolysis inhibition. It was found that some simple aldehydes have appreciable inhibitive effects. Out of 114 ketones tested, eight were effective.

Those who desire further information on these papers may obtain abstracts of any or all of them by writing to Dean R. F. Volker, School of Dentistry, University of Alabama.

R. W. BUNTING, *Secretary*

## Pharmacy (Section Np)

Section Np had a very successful meeting. The symposia presented were top programs, and the 30 papers presented at the contributed-papers sessions were of excellent quality. A count of the registered attendance shows that 164 individuals attended one or more of the five sessions.

The chief interest as shown by attendance was in the symposium on the "Applications of nucleonics to the health professions" and the panel discussion on "Hazardous household chemicals and agricultural poisons," both of which attracted interest outside the pharmaceutical group in attendance. Marshall Brucer (Oak Ridge Institute of Nuclear Studies) stated that radioactive drugs for medicinal uses—practically unknown 10 years ago—now are being produced on "an assembly-line basis." Radioisotopes are no longer research stunts and in a few instances are now the preferred method of diagnosis and the treatment of choice. Henry Blair (School of Medicine and Dentistry, University of Rochester) discussed in detail the relationship between radiation dose and the shortening of life span. He pointed out that animals exposed to ionizing radiation well above normal levels died of the symptoms of old age at a relatively young age. Howard E. Skipper (Southern Research Institute) indicated clearly the importance of radioactive isotopes in studies on the biochemical aspects of cancer chemotherapy. L. E. Brownell (Fission Products Laboratory, University of Michigan) and G. E. Burch (School of Medicine, Tulane) discussed the sterilization of drugs with gamma rays and the use of radioisotopes in cardiac research, respectively.

The dangers of household chemicals and agricultural poisons to the general public was covered by four experts in the field. B. E. Conley (Committee on Toxicology) said that the growing multiplicity of potentially harmful exposures to chemicals is poorly understood even by physicians and scientists and consequently the problem is more serious than the average person realizes. W. J. Hayes (Toxicology Section, USPHS, Savannah, Georgia) touched on the health problems of agricultural poisons. Veronica L. Conley discussed the harmful effects of chemicals on the skin, and L. M. Petrie discussed the health problems of industrial chemicals.

G. L. Jenkins (Purdue University School of Pharmacy) opened the contributed-papers sessions with a stimulating discussion on the standards of professionalism and how the profession of pharmacy measures up to these standards. The scientific papers were of unusual merit. Robert C. Anderson (Lilly Research Laboratories) reported on the properties of a new antibiotic, cycloserine, which is soon to be placed on the market. First-order drug elimination from the blood stream was discussed by J. V. Swintosky (S.K.F. laboratories). J. P. La Rocca (University of Georgia) reported on an evaluation procedure for sedative properties. J. A. Campbell (University of South Carolina) discussed the effects of pork-rich diets, and J. W. E. Harrisson (Harrisson Research Laboratories) presented the comparative effects of antacids on ulceration.

The hospital pharmacy group sponsored a paper on the cost data of injectables by J. A. Hunter (USPHS Hospital, Detroit, Mich.). Discussions by R. A. Williams (Department of Public Health, Atlanta) and J. W. Boenigh (Medical College of Virginia) on hospital pharmacy programs were also presented.

JOHN E. CHRISTIAN, *Secretary*

## Agriculture (Section O)

The Section O program was a four-session symposium on "Atomic energy and agriculture," sponsored jointly by the AAAS and the Oak Ridge Institute of Nuclear Studies. The sessions were concerned with: soil-plant relations; plant metabolism and crop improvement; animal metabolism; and food sterilization. The general chairman of the committee that arranged the symposium was Cyril L. Comar (Oak Ridge Institute of Nuclear Studies). These four sessions were presided over by R. F. Reitemeier (Soil and Water Branch, USDA), H. B. Tukey (department of horticulture, Michigan State University), Homer Patrick (University of Tennessee, Atomic Energy Commission Agricultural Research Program), and H. R. Kraybill (American Meat Institute Foundation, Chicago), and B. F. Trum (U.S. Army Veterinary Corps), respectively.

The speakers were chosen because of their knowledge of isotopes and broad understanding of agricultural problems. The program was especially valuable because it summarized and brought up to date the available information on radioisotopes as they relate to agriculture. The program was also very important to agriculture because of the stimulation of fundamental agricultural research.

In plant science, radioisotopes are contributing to the understanding of basic mechanisms of uptake of nutrient elements. In the soil, radioisotopes have furnished a tool for studies in ion mobility in soils, evaluation of native fertility, fertilizer management and distribution, and growth of roots. In the animal the whole spectrum of studies of nutrient absorption and utilization and the various physiological functions can be carried out through the use of radioisotopes under conditions that allow extrapolation to field conditions. It may also be noted that much of this animal research provides important information for problems of human nutrition and physiology. Radiation processing, through food sterilization offers the potentiality of preserving and shipping good-quality food and drugs to all areas of the world, whether or not refrigeration facilities are available. The economy and efficiency of this process needs further study.

Section O also cosponsored two symposiums of Section G–Botanical Sciences: "The tobacco plant" and "The cotton plant." These sessions involved the chemistry, physiology, pathology, and genetics of the two field crop plants.

One of the highlights of the Section O session was the presentation of the John Scott award to Edgar S. McFadden (Texas Agricultural Experiment Station) "for his origination and development of the first rust-resistant bread wheat." This award was presented to McFadden by Ernest T. Trigg, vice president, City of Philadelphia Board of Directors of City Trusts.

As one might expect, most of the symposium sessions were quite well attended by audiences that ranged from approximately 75 to 200 persons.

F. D. KEIM, *Secretary*

## Education (Section Q)

The Section Q meetings were definitely successful, although an unusual number of those who were preparing papers were absent because of illness. However, every session had good attend-

ance, and discussion from the floor was greater than is commonly experienced.

There were two sessions on gifted children and one on handicapped children. This last one was prepared by the International Council on Exceptional Children. There were two sessions in cooperation with the American Educational Research Association—one of these was a symposium on "The role of evaluation." There were four sessions of general papers.

Perhaps the highlight of the meeting was the session that included the vice-presidential address of Carter V. Good, "The role of values in educational research," and an address by B. R. Buckingham on "Permanent educational values in a world of change." Buckingham first attended meetings of Section Q, which was then Section L, in 1915. He was one of the founders of the AERA.

Section Q also cooperated in the symposium on "Recent research in science education," in the symposium "Science and humanities," and in various meetings of the Cooperative Committee.

D. A. WORCESTER, *Secretary*

## National Association for Research in Science Teaching (Q5)

The National Association for Research in Science Teaching presented a symposium entitled "Recent research in science education." The program was cosponsored by the National Science Teachers Association, the National Association of Biology Teachers, the Central Association of Science and Mathematics Teachers, the American Educational Research Association, the American Nature Study Society, the International Council for Exceptional Children, AAAS Section Q (Education), and the AAAS Cooperative Committee on the Teaching of Science and Mathematics.

The symposium consisted of six presentations: "Survey of research in elementary-school science education," Clark Hubler; "Implications of research in elementary-school science education," George G. Mallinson; "Survey of research in secondary-school science education," Jacqueline Buck Mallinson; "Implications of research in secondary-school science education," Hubert M. Evans; "Survey of research in college-level general education science," Edward K. Weaver; "Implications of research in college-level general education science," Woolford B. Baker. The meeting was presided over by Waldo W. E. Blanchet. Approximately 170 persons attended the meeting.

GEORGE G. MALLINSON,
*Program Chairman*

## National Science Teachers Association (Q6)

The National Science Teachers Association cooperated with the other science-teaching societies affiliated with the AAAS in their joint conference. At this, its mid-winter regional conference, NSTA sponsored three general sessions with ANSS and NABT. Each society was primarily responsible for the planning of one of the three sessions. The first general session, planned by ANSS was a symposium, "Southern agriculture from 1913 to 1956." The second general session was planned by NSTA. H. F. McDuffie (Homogenous Reactor Project, Oak Ridge National Laboratories), replaced John A. Swartout, who was ill, and presented a paper, "New frontiers in research." "Science and human resources" was the panel presentation of the NABT-planned session. All three general sessions were well attended and enthusiastically received.

The teaching societies were cosponsors of the NARST symposium, "Recent research in science education." NSTA felt privileged to be invited, along with all the other affiliated teaching societies, to cosponsor the AAAS special session, "The crisis in science education." The recognition of the position of science education and science teachers by the AAAS was a high point of the meeting.

"A Christmas interlude," a program of varied musical offerings and a magician's show, presented by the Atlanta Science Teachers Club for the entertainment of the visitors, was an outstanding event of the convention.

Top-flight scientists from industry and education presented lecture-demonstrations on the panel, "Attracting secondary-school students into science." A panel of leaders in education throughout the nation discussed the problem of developing continuity in the elementary-science program in the second concurrent session of Tuesday afternoon.

On Thursday afternoon, three concurrent sessions were devoted to the "Here's how I do it" theme. On the secondary level, all presentations were centered on evaluation of demonstrated classroom activities. In the elementary sessions, demonstrations on scientific toys, jets, the weather, and topics of equal interest were well presented and received.

A field trip to the granite outcrops near Atlanta and tours to industries and to the Communicable Disease Center of the USPHS were among the opportunities offered to the participants by the societies planning the joint conference. More than 300 registrants attended the various meetings and events of the conference.

KATHERINE HERTZKA,
*Program Chairman*

## Academy Conference (X1)

The Academy Conference held its annual meeting on 28 Dec. There were 48 present at the morning session, 26 of whom were official representatives of state and city academies of science. The afternoon session was attended by approximately 70.

At the business meeting presided over by the president, Leland H. Taylor (West Virginia Academy), an amendment to the constitution was made to allow the appointment of standing committees on the Junior Scientists Assembly, Collegiate Academies, Junior Academies of Science and Other Associated Secondary School Activities and Programs.

Clinton L. Baker (Tennessee Academy), archivist, invited all present to make use of the facilities of a booth set up by the Academy Conference in cooperation with the Georgia Academy of Science where friends might meet to discuss mutual academy problems and procedures and to see a display of the publications of all the academies.

John A. Behnke, AAAS, told briefly of the Science Teaching Improvement Program of the AAAS which is being financed by a $300,000 grant from the Carnegie Foundation. He stated that the AAAS would be glad to have someone at each state academy meeting to discuss the program. He announced the decision of the Board of Directors of the AAAS concerning the research funds that revert to the state academies from the AAAS. The funds had been specifically designated to be used for research grants at the secondary-school level. Since many representatives of academies felt that the academies should have the privilege of using the research funds for undergraduate college students, the conference asked the board to reconsider its decision. (A later decision of the board made it possible to use the funds at both college and secondary-school levels.)

Reports from the committees on Junior Scientists Assembly, on Junior Academies of Science, and on Collegiate Academies were presented.

The afternoon program consisted of a panel discussion of "The role of academies of science in the AAAS Science Teaching Improvement Program," and a talk by Clinton L. Baker on "Science fairs as an academy activity." Panel participants were John R. Mayor (STIP, AAAS), Wayne Taylor (University of Texas), and Ralph W. Lefler (Purdue University).

During the reports, discussions, and talks academy representatives were advised to encourage their academies to stimulate scientific education and research, to discover and develop scientific ability in elementary, secondary, and col-

lege students, and to diffuse scientific knowledge. Such purposes could be accomplished more effectively (i) by encouraging university and college science departments to accept responsibility for science teacher training programs and for offering graduate credit *in science* to teachers; (ii) by making possible symposium-type seminars for bringing teachers up to date in sciences; (iii) by promoting better working conditions, higher certification standards, and more adequate salaries for teachers of science; (iv) by encouraging state departments of education to use secondary-school science teachers as consultants; (v) by persuading educational institutions and industries to loan or give equipment no longer used to the schools, and (vi) by promoting the work of junior academies and science fairs to inspire potential future scientists.

The annual conference dinner, with Wayne Taylor officiating as toastmaster, was well attended.

THELMA C. HEATWOLE, *Secretary*

### American Nature Study Society (X3)

The 48th annual meeting of the American Nature Study Society began with a panel on "Southern agriculture from 1913 to 1956." Under the able leadership of J. W. Fanning, the panel members were George King, S. G. Chandler, Herbert L. Stoddard, Sr., and Ed Komarek. The discussion began with the contributions of the experiment stations and the extension division, was continued with the part played by forestry and wildlife, and ended with the goal we are aiming toward—the broadening concept of land management with its favorable influence on the economy of the South.

The first afternoon session concerned the philosophy of the Nature Study Idea and its contribution to the school program. E. L. Palmer shared, through movies and recordings, his experiences with some of the early workers at Cornell —the Comstocks, Gage, Bailey, and Jordan. Walter Thurber discussed the contributions of nature study to the elementary and secondary schools, and Stanley Mulaik presented the role of nature study in the general-education program at the college level.

A second afternoon session afforded a galaxy of outstanding nature writers—Roger Tory Peterson, Herbert Zim, Millicent Selsam, Ed. Dodd and Charles Mohr. The theme of this session was "The appeal of the nature writer to all age groups."

The usual friendly, informal atmosphere was evident at the annual showing of kodachromes and the ANSS dinner with its presidential address. The meeting ended with a field trip to study the unusual plant life found on granite outcrops at Mount Arabia and Stone Mountain.

MALVINA TRUSSELL, *President*

### Conference on Scientific Editorial Problems (X4)

The fourth conference on scientific editorial problems consisted of four sessions. The first was held on the morning of 28 Dec. and was presided over by C. M. Johnson (Technical Information Division, U.S. Navy Electronics Laboratory, San Diega, Calif.). The keynote address, "Need for improving technical communication in our technological society," was delivered by Saul Herner (Technical Information, Library Planning Group, Atlantic Research Corporation, Alexandria, Va.). The session concluded with Johnson's outline of the program for the subsequent sessions.

The afternoon session of 28 Dec. consisted of two concurrent discussion panels. One panel was presided over by Paul H. Flint (Tufts) and by J. G. Adashko (Ford Instrument Company, Long Island City, N.Y.). The panel discussed scientific and technical writing, scientific and technical editing, and graphic methods in the communication of scientific and technical information. Speakers included Christian Arnold (Penn State College), C. I. Hartley (Hartley Productions, New York), W. W. Heller (Duke University), J. E. Levy (Washington Engineering Services, Bethesda, Md.), H. E. Marschalk (Bureau of Ordnance, U.S. Navy), E. J. Megroth (Painesville, Ohio), and John Wilson (U.S. Naval Ordnance Test Station, China Lake, Calif.).

The other concurrent panel, led by Martin E. Jansson (Naval Research Laboratory), and James W. Perry (Western Reserve University), was devoted to storage and retrieval of scientific and technical information and to management of publications. Short addresses were delivered by Eugene Garfield (Smith, Kline and French Laboratories), "Documentation today, its status and trends"; Samuel N. Alexander (National Bureau of Standards), "Current trends in information-retrieval instrumentation"; and Dwight E. Gray (Library of Congress), "How well is the job of presenting technical information being done?" Both panels were followed by general discussion from the floor.

The third session, Thursday morning, was a continuation of the Wednesday afternoon session. Short addresses by J. R. Gould (Rensselaer Polytechnic Institute) and Wallace R. Brode (National Bureau of Standards), "Responsibilities and limitations of authors, editors, referees, and readers in journal publication," preceded the panel discussion and the general discussion on the floor.

The fourth closing plenary session, Thursday afternoon, was presided over by Johnson. The moderators of the various discussion panels reported on the conclusions of the various panels, and this was followed by a discussion and by a closing address, "The significance of improving technical communication in our technological society," delivered by A. N. Spence (Executive Office, U.S. Department of the Navy).

Plans are being made for the fifth conference on scientific editorial problems to be held in conjunction with the 1956 AAAS meeting in New York.

J. G. ADASHKO, *Program Committee*

### International Geophysical Year (X7)

The scientific program of the International Geophysical Year, 1957–58, was presented in a series of three sessions on the mornings of 27–29 Dec. The IGY will transcend the previous international polar years of 1882–83 and 1932–33 in that it covers the whole globe (in contrast to the limited northern latitudes of the polar years), embraces most of the fields of geophysics, and will have the concentrated efforts of scientific organizations of at least 42 nations.

The symposium consisted of 18 papers. Of these, two were concerned with broad international and national aspects of the IGY; three dealt with some regional aspects of the program; and 13 dealt with disciplines and areas of scientific activity: aurora, airglow, cosmic rays, geomagnetism, glaciology, gravity measurements, ionospheric physics, meteorology, oceanography, high-atmosphere rocket studies, seismology, and the satellite program. The scientific papers presented, in general, the status of our knowledge in a particular field of geophysics, the nature of the problems of current interest, and the proposed IGY programs of research and observation, with emphasis on the work planned by scientists of the United States.

Session 1, Joseph Kaplan, presiding; "Earth, sun, and interplanetary medium," F. L. Whipple (Harvard University) (summary presented by A. H. Shapley); "The oceans and the earth," R. R. Revelle (Scripps Institution of Oceanography); "Glaciers and ice fields," W. O. Field (American Geographical Society); "Seismology and the earth's structure," A. P. Crary (Air Force Cambridge Research Center); "The earth's gravity," George P. Woollard (University of Wis-

consin); "International aspects of the IGY program," L. V. Berkner (Associated Universities, Inc.).

Session 2, L. V. Berkner, presiding; "The earth's magnetic field," E. O. Hulburt (Naval Research Laboratory); "The ionosphere," M. G. Morgan (Dartmouth College); "The aurora," C. T. Elvey (University of Alaska); "The Airglow," E. R. Manring (Air Force Cambridge Research Center); "Geophysical aspects of cosmic rays," S. E. Forbush (Carnegie Institution of Washington); "The IGY program of the United States," Joseph Kaplan (University of California).

Session 3, A. H. Shapley, presiding; "Weather and atmosphere," Harry Wexler (U.S. Weather Bureau); "Rocket exploration of the upper atmosphere," J. A. Van Allen (State University of Iowa); "The IGY earth satellite program," H. E. Newell, Jr. (Naval Research Laboratory); "The antarctic IGY program," L. M. Gould (Carleton College); "The equatorial IGY program," R. C. Peavey (National Academy of Sciences) (summary presented by A. H. Shapley); "The northern latitudes IGY program," N. C. Gerson (Air Force Cambridge Research Center).

The symposium was jointly sponsored by the AAAS, AGU, NAS-NRC, and NSF. The program was planned by the following committee: Joseph Kaplan and Hugh Odishaw (cochairmen); W. W. Atwood, Jr., W. A. Baum, J. W. Joyce, G. F. Schilling, A. H. Shapley, Waldo E. Smith, R. L. Taylor.

HUGH ODISHAW, *Executive Secretary, U.S. National Committee-IGY, National Academy of Sciences*

## Scientific Research Society of America (X11)

The 7th annual convention of the Scientific Research Society of America (RESA) was held on 29 Dec. Delegates from 12 branches and clubs were registered. The chairman reported that five chapters and one club had been installed during 1955, as follows: Electronic Defense Laboratory, Sequoia Branch (Mountain View, Calif.); General Electric Company, Ithaca Branch (New York); Hughes Laboratories Branch (Culver City, Calif.); International Nickel Co., Inco Development & Research Club (Bayonne, N.J.); Magnolia Petroleum Branch (Dallas, Texas); National Bureau of Standards, Boulder Branch (Colorado).

The annual RESA Address was given by Robert R. Williams on "Chemistry as a supplement to agriculture in meeting world food problems." Williams later received the $1000 William Procter Prize for Scientific Achievement.

DONALD D. PRENTICE, *Director*

## Sigma Delta Epsilon (X12)

A tea for all women in science was held on 28 Dec. Approximately 45 members and friends attended. Next year the annual convention will be held with the AAAS in New York.

EMILY T. WOLFF, *President*

## New Books

*Clays and Clay Minerals.* Proceedings of the Second National Conference on Clays and Clay Minerals. University of Missouri, 15–17 October 1953. Ada Swineford and Norman Plummer, Eds. National Academy of Sciences–National Research Council, Washington, 1954. 498 pp. $4.

*Portrait of an American Labor Leader, William L. Hutcheson.* Saga of the United Brotherhood of Carpenters and Joiners of America, 1881–1954. Maxwell C. Raddock. American Institute of Social Sciences, Inc., New York, 1955. 430 pp. $5.

*Laboratory Manual for Introduction to Pharmacy* (revision of *Laboratory Manual for Principles and Processes of Pharmacy*). Henry M. Burlage, Joseph B. Burt, L. Wait Rising, and William J. Sheffield, Jr. Blakiston Div., McGraw-Hill, New York, ed. 3, 1956. 271 pp. $4.50.

*The Fields of Group Psychotherapy.* S. R. Slavson, Ed. International Universities Press, New York, 1956. 338 pp. $6.

*Temperature, Its Measurement and Control in Science and Industry.* vol. II. Papers presented at the Third Symposium on Temperature, Washington, D.C., 28–30 October 1954. Hugh C. Wolfe, Ed. Reinhold, New York; Chapman & Hall, London, 1955. 467 pp. $12.

*Vacuum Valves in Pulse Technique.* P. A. Neeteson. Philips' Technical Library, Eindhoven, Netherlands, 1955. 170 pp. $4.50.

*A Symposium on Inorganic Nitrogen Metabolism: Function of Metallo-Flavorproteins.* Sponsored by McCollum-Pratt Institute of Johns Hopkins University. William D. McElroy and Bentley Glass, Eds. Johns Hopkins Univ. Press, Baltimore, 1956. 728 pp. $10.

*Fish Saving.* A history of fish processing from ancient to modern times. Charles L. Cutting. Philosophical Library, New York, 1956. 372 pp. $12.

*Cancer of the Lung.* Pathology, diagnosis, and treatment. Milton B. Rosenblatt and James R. Lisa. Oxford Univ. Press, New York, 1956. 330 pp. $15.

*Mesons and Fields.* vol. 1, *Fields.* Silvan S. Schweber, Hans A. Bethe, and Frederic De Hoffman. Row, Peterson, Evanston, Ill., 1955. 449 pp. $8.

*Advances in Carbohydrate Chemistry.* vol. 10. Melville L. Wolfrom, Ed. Academic Press, New York, 1955. 437 pp. $10.50.

*Man and Energy.* A. R. Ubbelohde. George Braziller, New York, American ed. 1, 1955. 247 pp. $5.

*Ministry and Medicine in Human Relations.* Iago Galdston, Ed. International Universities Press, New York, 1955. 173 pp. $3.50.

## Miscellaneous Publications

*(Inquiries concerning these publications should be addressed, not to Science, but to the publisher or agency sponsoring the publication.)*

*Notropis Euryzonus, a New Cyprinid Fish from the Chattahoochee River System of Georgia and Alabama.* Tulane Studies in Zoology, vol. 3, No. 5. Royal D. Suttkus. 16 pp. $0.50. *Factors Influencing the Rate of Oxygen Consumption of the Dwarf Crawfish, Cambarellus Shufeldtii (Decapoda, Astacidae).* vol. 3, No. 6. Milton Fingerman. 12 pp. $0.35. Tulane Univ., New Orleans, La., 1955.

*The Fishes of the Genus Tetragonurus Risso.* Dana-Report No. 41. Carlsberg Foundation's oceanographical expedition round the world 1928–30 and previous "Dana"-expeditions under the leadership of the late professor Johannes Schmidt. Marion Grey. Carlsberg Foundation, Copenhagen, 1955. 75 pp. £1.

*Psychologists in Action.* Pamphlet No. 229. Elizabeth Ogg. Public Affairs Committee, New York, 1955. 28 pp. $0.25.

*Physical Society, London, Yearbook, 1955.* Physical Soc., London, 1955. 92 pp. 10s.

*Panorama of Progress.* Honoring Benjamin Franklin, 1706–1956. *Journal of the Franklin Institute,* vol. 261, No. 1. Franklin Inst., Philadelphia 3, Pa., 1956. 188 pp. $1.

*Rockefeller Foundation, Annual Report, 1954.* The Foundation, New York, 1955. 439 pp.

*Central Laboratories for Scientific and Industrial Research, Hyderabad, India, Annual Report, 1954.* The Laboratories, Hyderabad, 1955. 64 pp.

*Dania Polyglotta.* Répertoire bibliographique annuel des ouvrages, articles, résumés, etc. en langues étrangères parus en Danemark. Dixième année, 1954. Institut Danois des Echanges Internationaux de Publications Scientifiques et Littéraires, Copenhague, 1955. 243 pp.

*American College of Hospital Administrators, Roster of Membership, Constitution and Bylaws, 1956.* American College of Hospital Administrators, Chicago 11, 1956. 134 pp.

*Language in Relation to a Unified Theory of the Structure of Human Behavior.* pt. II. Kenneth L. Pike. Summer Inst. of Linguistics, Glendale, Calif., 1955. 85 pp. $2.

*Wesleyan University Bulletin, Annual Report Number: 1954–55.* Wesleyan Univ. Press, Middletown, Conn., 1955. 62 pp.

*ASTM Standards on Plastics.* Specifications, methods of testing, nomenclature, definitions. Sponsored by ASTM Committee D-20 on Plastics. American Soc. for Testing Materials, Philadelphia 3, 1955. 790 pp. $5.75.

*Factors Related to Frost Action in Soils.* Highway Research Bd. Bull. 111. National Acad. of Sciences–National Research Council, Washington, 1955. 110 pp. $2.25.

*Self-Help for the Arthritic.* A course of home treatment for the commoner types of arthritis. David White. Kimpton, London, 1955. 55 pp. $0.70.

*Carnegie Corporation of New York, Annual Report for the Year Ending 30 September 1955.* Carnegie Corp., New York, 1955. 92 pp.

# Scientific Meetings

## Asian Science

The importance of the Bandung Conference has recently been stressed by newspapers and analysts. Perhaps because of earlier underemphasis, it is not generally known that the conference adopted a resolution on development of science and technology in the participating countries. A full account by Narendra Singh, secretary of the Association of Scientific Workers of India, was published in the *Bulletin of the World Federation of Scientific Workers* (September 1955) under the title "First steps to scientific collaboration in Asia."

A science commission of the participating countries was organized prior to the Bandung Conference at the suggestion of the Indian ASW. Its meetings in New Delhi on 7–8 April 1955 were attended by representatives from Ceylon, the People's Republic of China, Japan, North Korea, Lebanon, Mongolia, Syria, U.S.S.R., and North Viet Nam, as well as the host nation, India.

The session on the first agenda item—exchange of scientific knowledge and personnel among Asian countries—was chaired by E. Zhukov (U.S.S.R. Academy of Sciences). The main report, given by S. S. Sokhey (president, ASW of India), called for (i) exchange of students and teachers, (ii) study tours, and (iii) exchange of research personnel among the Asian countries.

The second session, devoted to peaceful applications of atomic energy, was presided over by G. Tominaga (Tokyo). The main report, by E. Zhukov, dealt with the construction of the first plants for atomic power production. All the papers stressed that "the existing system of secrecy" was "the chief obstacle to the development of the peaceful applications of atomic energy."

The third session, Ting Hsi Lin (People's Republic of China) presiding, discussed "The destructive effects of atomic and thermonuclear explosions and of their banning." The main report, by H. Kumabe, gave Japanese data on the devastation and harmful effects of atomic and thermonuclear weapons.

A drafting committee consisting of three Indian members (S. S. Sokhey, R. Ahmed, and N. Singh) and one each from the People's Republic of China (Ting Hsi Lin), Japan (G. Tominaga), and the U.S.S.R. (Zhukov) formulated a resolution that was subsequently presented by Sokhey at the Bandung Conference, where it was unanimously adopted.

The conference established a Scientific Liaison Committee for collaboration and mutual help; it is to collect and distribute information on scientific work in the various countries and to arrange exchanges of scientific workers. It further resolved to create among the Asian countries an agency for promoting cooperation and coordination "to take the fullest benefit of atomic energy developments, while extending scientific and economic freedom." The conference recognized that "free exchange of knowledge about the subject" is "a factor of utmost importance in the development of atomic energy" and that "secrecy can be removed only if a climate of greater mutual confidence is brought about by the banning of atomic and thermonuclear weapons." Accordingly, it put forth the "demand that atomic, thermonuclear, and other weapons of mass destruction should be banned . . . the stocks of these weapons should be dismantled and the nuclear material should be utilized for peaceful developments." The conference also appealed "to the Governments concerned to stop immediately experimental explosions."

—H. GRUNDFEST, *President, American Association of Scientific Workers*
*Columbia University College of Physicians and Surgeons, New York*

## Meeting Notes

■ Problems associated with the insurance of nuclear power plants will be given special attention at the 18th annual American Power Conference that is to take place at the Hotel Sherman, Chicago, 21–23 Mar. Insurance coverage will be discussed at a nuclear energy forum on 21 Mar. Other subjects to be covered at the nuclear forum, one of the 23 technical sessions on the program, will be the roles of Government and industry in atomic power development and research in nuclear power.

Clarence A. Davis, Under Secretary of the Interior, and R. S. Stevenson, president of the Allis-Chalmers Manufacturing Company, will speak at the opening general session, and John T. Rettaliata, president of Illinois Institute of Technology, will address the All Engineers dinner on 22 Mar. Luncheon speakers will include Harllee Branch, Jr., president of the Edison Electric Institute; Herbert D. Vogel, chairman of the board of the Tennessee Valley Authority; and John Jirgal, chairman of the group on power generation and distribution of the second Hoover Commission.

The meeting is sponsored by Illinois Institute of Technology in cooperation with 14 universities and nine national and regional technical societies. More than 3000 business and industrial executives, engineers, educators, and Government officials are expected to attend the conference, which is being directed by R. A. Budenholzer, professor of mechanical engineering at IIT.

■ The Tissue Culture Association will hold its seventh annual meeting 3–4 Apr. at the Marquette University Medical School. On the first day there will be a conference on "The biology of cell strains" at which invited papers will be presented under the chairmanship of Joseph Leighton with the assistance of cochairman John H. Hanks. On the second day, in joint session with the American Association of Anatomists, the time will be devoted to free papers from the membership that for the most part will continue the theme of the previous day.

■ Sixty or more geophysicists met in Washington from 1 to 3 Feb. at a conference on theoretical geophysics that was sponsored jointly by the National Science Foundation and the Carnegie Institution of Washington. The meeting was called to consider the current status of knowledge in theoretical geophysics in this country and abroad; to encourage and increase activity in theoretical geophysics; and to discuss future programs and operations.

The chairman of the conference was John von Neumann of the Institute of Advanced Study, Princeton, N.J., and a member of the Atomic Energy Commission. The vice-chairman was E. H. Vestine, department of terrestrial magnetism, Carnegie Institution of Washington.

## Society Elections

■ American Society of Parasitologists: pres., Eloise B. Cram, National Institutes of Health, Bethesda, Md.; pres.-elect,

Gilbert F. Otto, Abbott Laboratories, North Chicago, Ill.; v. pres., Aurel O. Foster, U.S. Department of Agriculture, Beltsville, Md.; sec. and exec. officer, Arthur C. Walton, Knox College; treas., Robert M. Stabler, Colorado College. Representatives to the AAAS Council are Raymond M. Cable and Richard P. Hall.

■ Society of Systematic Zoology: pres., G. W. Wharton, Jr., University of Maryland; pres.-elect, R. C. Moore; sec., R. E. Blackwelder, 3728 2nd St., S., Arlington 4, Va.; treas., F. M. Hull. Blackwelder and W. L. Schmitt are the representatives to the AAAS Council.

■ Econometric Society: pres., Kenneth Arrow, Stanford University; v. pres., Trygve Haavelmo, University of Oslo, Oslo, Norway; sec., Richard Ruggles, Yale University; treas., Alfred Cowles, Cowles Commission for Research in Economics, Chicago, Ill. Representative to the AAAS Council is Charles F. Roos.

■ Academy Conference: pres., Rev. P. H. Yancey, Spring Hill College; pres.-elect, Ralph W. Lefler, Purdue University; past pres., Leland H. Taylor, West Virginia University; sec.-treas., Thelma C. Heatwole, 1411 Churchville Ave., Staunton, Va.

■ American Society of Limnology and Oceanography: pres., Alfred C. Redfield; v. pres., Robert C. Ball; sec.-treas., Bostwick H. Ketchum, Woods Hole Oceanographic Institution, Woods Hole, Mass. Representative to the AAAS Council is Waldo Schmitt.

■ American Phytopathological Society: pres., Helen Hart, University of Minnesota; v. pres., Paul R. Miller, U.S. Department of Agriculture, Beltsville, Md.; sec., Glenn S. Pound, University of Wisconsin; treas., Saul Rich, Connecticut Agricultural Experiment Station. Representatives to the AAAS Council are J. G. Horsfall and Curtis May.

■ American Nature Study Society: pres., Malvina Trussell, 2011 Lee, Tallahassee, Fla.; v. pres., Richard Weaver, University of Michigan; sec., Helen B. Ross, State Teachers College, Fitchburg, Mass.; treas., Howard Weaver, University of Illinois. Representative to the AAAS Council is E. L. Palmer.

■ Oklahoma Academy of Science: pres., A. M. Stebler, Oklahoma A. & M. College; v. pres. and sec.-treas., D. E. Howell, Oklahoma A. & M. College; asst. sec.-treas., Phillip Smith, University of Oklahoma; permanent secretary (acting), Ralph E. Olson, University of Oklahoma.

■ American Society of Zoologists: pres., Viktor Hamburger; v. pres., Harold H. Plough; sec., Rudolph T. Kempton, Vassar College; treas., Theodore L. Jahn.

■ Institute of Mathematical Statistics: pres., David Blackwell, University of California, Berkeley; pres.-elect, Alexander M. Mood, Santa Monica, Calif.; sec., George E. Nicholson, Jr., University of North Carolina; treas., Albert H. Bowker, Stanford University. Representative to the AAAS Council is Harold Hotelling.

■ American Society of Human Genetics: pres., Sheldon C. Reed; pres.-elect, Curt Stern; v. pres., Madge T. Macklin; sec., Eldon J. Gardner, Utah State Agricultural College; treas., W. E. Heston.

## Forthcoming Events

### March

*15–17.* American Orthopsychiatric Assoc., 33rd annual, New York, N.Y. (M. F. Langer, AOA, 1790 Broadway, New York 19.)

*15–17.* American Physical Soc., Pittsburgh, Pa. (K. K. Darrow, APS, Columbia Univ., New York 27.)

*15–17.* Kappa Delta Pi, annual, Stillwater, Okla. (E. I. F. Williams, 238 E. Perry St., Tiffin, Ohio.)

*16–18.* International Assoc. for Dental Research, St. Louis, Mo. (D. Y. Burrill, 129 E. Broadway, Louisville 2, Ky.)

*17–18.* National Soc. of Professional Engineers, annual spring, Washington, D.C. (K. E. Trombley, NSPE, 1121 15 St., NW, Washington 5.)

*18–24.* American Soc. of Photogrammetry, annual, joint meeting with American Cong. on Surveying and Mapping, Washington, D.C. (ACSM–ASP, Box 470, Washington 4.)

*19–21.* Div. of Fluid Dynamics, American Physical Soc., Pasadena, Calif. (F. N. Frenkiel, Applied Physics Laboratory, John Hopkins Univ., Silver Spring, Md.)

*19–22.* American Acad. of General Practice Scientific Assembly, 8th annual, Washington, D.C. (AAGP, Broadway at 34th, Kansas City 11, Mo.)

*19–22.* Inst. of Radio Engineers National Convention, New York. (E. K. Gammett, IRE, 1 E. 79 St., New York 21.)

*19–23.* American Soc. of Tool Engineers, Chicago, Ill. (H. C. Miller, Armour Research Foundation, 35 W. 33 St., Chicago 16.)

*21–22.* National Health Forum, New York, N.Y. (T. G. Klumpp, National Health Council, 1790 Broadway, New York 19.)

*21–23.* American Power Conf., 18th annual, Chicago, Ill. (R. A. Budenholzer, Illinois Institute of Technology, Chicago 16.)

*21–24.* American Astronomical Soc. Columbus, Ohio. (J. A. Hynek, McMillin Observatory, Ohio State Univ., Columbus.)

*22–24.* Michigan Acad. of Science, Arts and Letters, annual, Ann Arbor. (G. M. McEwen, 5 East Hall, Univ. of Michigan, Ann Arbor.)

*23–24.* Eastern Psychological Assoc., Atlantic City, N.J. (G. G. Lane, Univ. of Delaware, Newark.)

*23–24.* North Carolina Acad. of Science, annual, Chapel Hill. (J. A. Yarbrough, Meredith College, Raleigh.)

*24–25.* American Psychosomatic Soc., 13th annual, Boston, Mass. (T. Lidz, APS, 551 Madison Ave., New York 22.)

*24–31.* Perspectives in Marine Biology, La Jolla, Calif. (A. A. Buzzati-Traverso, Scripps Institution of Oceanography, La Jolla.)

*25–28.* American Assoc. of Dental Schools, annual, St. Louis, Mo. (M. W. McCrea, 42 S. Greene St., Baltimore 1, Md.)

*25–29.* American College Personnel Assoc., Washington, D.C. (Miss C. M. Northrup, Univ. of Denver, Denver, Colo.)

*28–3.* Colloquium on Frontiers in Physical Optics, Boston, Mass. (S. S. Ballard, Visibility Laboratory, Scripps Institution of Oceanography, San Diego 52, Calif.)

*29–31.* Alpha Epsilon Delta, 11th national convention, Jackson, Miss. (M. L. Moore, 7 Brookside Circle, Bronxville 8, N.Y.)

*29–31.* Pennsylvania Acad. of Science, Indiana. (K. Dearolf, Public Museum and Art Gallery, Reading, Pa.)

*29–31.* Southern Soc. for Philosophy and Psychology, Asheville, N.C. (J. E. Moore, Georgia Inst. of Technology, Atlanta.)

*29–31.* Symposium on Fundamental Cancer Research, 10th annual, Houston, Tex. (G. Taylor, Univ. of Texas Postgraduate School of Medicine, Houston 25.)

*30–31.* Alabama Acad. of Science, annual, Montevallo. (H. A. McCullough, Howard College, Birmingham, Ala.)

### April

*2–5.* Assoc. of American Geographers, annual, Montreal, Canada. (B. W. Adkinson, Library of Congress, Washington 25.)

*2–7.* Symposium on Crystallography, Madrid, Spain. (M. Abbad, Serrano 118, Madrid.)

*3.* Microcirculatory Conf., 3rd, Milwaukee, Wis. (G. P. Fulton, Dept. of Biology, Boston Univ., 675 Commonwealth Ave., Boston 15, Mass.)

*3–4.* Tissue Culture Assoc., 7th annual, Milwaukee, Wis. (D. C. Hetherington, Duke Univ. School of Medicine, Durham, N.C.)

*3–9.* International Symposium on Macromolecular Chemistry, Rehovoth, Jerusalem, and Haifa, Israel. (A. Katchalsky, Weizmann Inst. of Science, Rehovoth.)

*4–6.* American Assoc. of Anatomists, annual, Milwaukee, Wis. (N. L. Hoerr, 2109 Adelbert Rd., Cleveland 6, Ohio.)

*4–6.* American Soc. of Lubrication Engineers, 11th annual, Pittsburgh, Pa. (Administrative Secretary, ASLE, 84 E. Randolph St., Chicago 1, Ill.)

*4–7.* International Cong. of Medical Radiography 2nd, Paris, France. (Secretariat, 66, Blvd. St. Michel, Paris 6.)

*5–6.* Conf. on Magnetic Amplifiers, Syracuse, N.Y. (C. A. Priest, 314 Hurlburt Rd., Syracuse 3.)

# New Academic Press Publications

**January–July 1956**

## BOOKS

BAMFORD, C. H., ELLIOTT, A., AND HANBY, W. E.
**Synthetic Polypeptides: Preparation, Structure, and Properties (Physical Chemistry Monograph, Vol. V)**
June 1956

BERL, W. G. (ED.)
**Physical Methods in Chemical Analysis. Vol. III**
May 1956

BIRKHOFF, G., AND ZARANTONELLO, E. H.
**Jets, Wakes, and Cavities**
June 1956

BOURNE, G. H. (ED.)
**Biochemistry and Physiology of Bone**
March 1956

BRILLOUIN, L.
**Science and Information Theory**
March 1956

CHEVALLEY, C.
**Fundamental Concepts of Algebra (Mathematics Monograph, Vol. VII)**
July 1956

COLOWICK, S. P., AND KAPLAN, N. O. (EDS.)
**Methods in Enzymology. Vol. III**
June 1956

EIRICH, F. R. (ED.)
**Rheology Treatise (In 3 vols.). Vol. I**
April 1956

GAEBLER, O. H. (ED.)
**Enzymes: Units of Biological Structure and Function. Henry Ford Hospital International Symposium**
March 1956

GUSTAVSON, K. H.
**The Chemistry and Reactivity of Collagen**
February 1956, 342 pp., $8.00

GUSTAVSON, K. H.
**The Chemistry of Tanning Processes**
February 1956, 403 pp., $9.00

HERSHENSON, H. M.
**Visible and Ultraviolet Spectra: Twenty-Five Year Index (1930–1954)**
May 1956

HINE, G. J., AND BROWNELL, G. L. (EDS.)
**Radiation Dosimetry**
March 1956

KABAT, E. A.
**Blood Group Substances: Their Chemistry and Immunochemistry**
January 1956, 330 pp., $8.00

KAUZMANN, W.
**Quantum Chemistry**
June 1956

KOPFERMANN, H.
**Nuclear Moments**
**Translated from the 2nd German revised edition, by E. E. Schneider**
Summer 1956

LEVITT, J.
**The Hardiness of Plants (Agronomy Monograph, Vol. VI)**
June 1956

MONTAGNA, W.
**The Structure and Function of Skin**
March 1956

NACHOD, F. C., AND SCHUBERT, J. (EDS.)
**Ion Exchange Technology**
April 1956

OSTER, G., AND POLLISTER, A. W. (EDS.)
**Physical Techniques in Biological Research**
**Vol. II (Physical Chemical Techniques)**
April 1956
**Vol. III (Cells and Tissues)**
May 1956

OSWATITSCH, K.
**Gas Dynamics**
**English version by G. Kuerti**
Summer 1956

PINCUS, G., AND ENGLE, E. T. (EDS.)
**Hormones and the Aging Process**
March 1956

SAGE, B. H., CORCORAN, W. H., AND OPFELL, J. F.
**Momentum Transfer in Fluids**
May 1956

SOMMERFELD, A.
**Thermodynamics and Statistical Mechanics (Lectures on Theoretical Physics, Vol. V.)**
February 1956, 401 pp., $7.00

UNDERWOOD, E. J.
**Trace Elements in Human and Animal Nutrition**
March 1956

## SERIAL PUBLICATIONS

**Advances in Applied Mechanics. Vol. IV**
H. L. DRYDEN, TH. v. KÁRMÁN, AND G. KUERTI (EDS.)
February 1956

**Advances in Biological and Medical Physics. Vol. IV**
J. H. LAWRENCE AND C. A. TOBIAS (EDS.)
February 1956

**Advances in Cancer Research. Vol. IV**
J. P. GREENSTEIN AND A. HADDOW (EDS.)
July 1956

**Advances in Chemical Engineering. Vol. I**
T. B. DREW AND J. W. HOOPES, JR. (EDS.)
May 1956

**Advances in Electronics and Electron Physics. Vol. VII**
L. MARTON (ED.)
January 1956, 527 pp., $11.50

**Advances in Genetics. Vol. VIII**
M. DEMEREC (ED.)
April 1956

**Advances in Protein Chemistry. Vol. X**
M. L. ANSON, K. BAILEY, AND J. T. EDSALL (EDS.)
January 1956, 425 pp., $9.00

**The Harvey Lectures, Series 50 (1954–1955)**
**(Incl. cumulative contents, author and subject indexes, Series 1–50)**
March 1956

**International Review of Cytology. Vol. V**
G. H. BOURNE AND J. F. DANIELLI (EDS.)
May 1956

**Solid State Physics. Vol. II**
F. SEITZ AND D. TURNBULL (EDS.)
May 1956

## NEW JOURNALS

**Journal of Electronics**
Vol. 1, July 1955–June 1956, 6 parts, $15.40

**Nuclear Science and Engineering:**
*The Journal of the American Nuclear Society*
Vol. 1, 1956, 6 issues, $10.00

## ACADEMIC PRESS INC., Publishers

**125 East 23 Street, New York 10, New York**

*5–7.* Optical Soc. of America, Philadelphia, Pa. (A. C. Hardy, Room 8–203, Massachusetts Inst. of Technology, Cambridge 39.)

*6–7.* American Assoc. of University Professors, St. Louis, Mo. (R. F. Fuchs, AAUP, 1785 Massachusetts Ave., NW, Washington 6.)

*6–7.* National Speleological Soc., Nashville, Tenn. (Mrs. L. Cutler, 2829 Buchanan St., Arlington 6, Va.)

*6–8.* American Assoc. of Physical Anthropologists, Chicago, Ill. (J. L. Angel, Daniel Baugh Inst. of Anatomy, Jefferson Medical College, Philadelphia 7, Pa.)

*7–8.* American Soc. of Hospital Pharmacists, Detroit, Mich. (Miss G. Niemeyer, 2215 Constitution Ave., NW, Washington 7.)

*8.* American College of Apothecaries, Detroit, Mich. (R. E. Abrams, Hamilton Court, Philadelphia 4, Pa.)

*8–10.* American Assoc. of Colleges of Pharmacy, Detroit, Mich. (R. A. Deno, College of Pharmacy, Univ. of Michigan, Ann Arbor.)

*8–13.* American Chemical Soc., Dallas, Tex. (A. H. Emery, ACS, 1155 16 St., NW, Washington 6.)

*8–13.* American Pharmaceutical Assoc., annual, Detroit, Mich. (R. P. Fischelis, APA, 2215 Constitution Ave., NW, Washington 7.)

*8–13.* Symposium on Problems of Automation, Milan, Italy. (Consiglio Nazionale delle Ricerche, Ufficio Congressi e Mostre, 7 Piazzale delle Scienze, Rome, Italy.)

*9–11.* American Assoc. of Feed Microscopists, annual, Terre Haute, Ind. (R. C. Wornick, Agricultural Research Dept., Chas. Pfizer & Co., Inc., Terre Haute.)

*9–12.* International Anesthesia Research Soc., 30th annual cong., Miami Beach, Fla. (R. J. Whiteacre, 13951 Terrace Rd., Cleveland 12, Ohio.)

*10–11.* Symposium for Management on Applications of Analog Computers, Kansas City, Mo. (O. Fanning, Midwest Research Inst., 425 Volker Blvd., Kansas City 10.)

*12.* Assoc. of Vitamin Chemists, Chicago, Ill. (M. Freed, Dawes Products, 4800 S. Richmond, Chicago 32.)

*13–14.* Louisiana Acad. of Science, annual, New Orleans, La. (H. B. Boudreaux, Dept. of Zoology, Louisiana State Univ., Baton Rouge 3.)

*14.* South Carolina Acad. of Science, annual, Clemson, S.C. (H. W. Freeman, Univ. of South Carolina, Columbia.)

*15–16.* American Soc. for Artificial Internal Organs, Atlantic City, N.J. (P. F. Salisbury, Cedars of Lebanon Hospital, 4751 Fountain Ave., Los Angeles 29, Calif.)

*15–20.* American Soc. for Pharmacology and Experimental Therapeutics, Atlantic City, N.J. (C. C. Pfeiffer, Emory Univ. School of Medicine, Emory University, Ga.)

*15–21.* American Inst. of Nutrition, Atlantic City, N.J. (R. W. Engel, Virginia Polytechnic Inst., Blacksburg.)

*15–21.* American Physiological Soc., Atlantic City, N.J. (M. O. Lee, 9650 Wisconsin Ave., NW, Washington 14.)

*15–21.* American Soc. for Experimental Pathology, annual, Atlantic City, N.J. (C. C. Erickson, 858 Madison Ave., Memphis, Tenn.)

*15–21.* Federation of American Societies for Experimental Biology, Atlantic City, N.J. (M. O. Lee, 9650 Wisconsin Ave., NW, Washington 14.)

*16–18.* Aero Medical Assoc., 27th annual, Chicago, Ill. (J. P. Marbarger, Aeromedical and Physical Environment Lab., Univ. of Illinois, Chicago.)

*16–19.* Conf. on Communication of Information by Workers Studying Sounds of Biological Significance, University Park, Pa. (H. Frings, Dept. of Zoology and Entomology, Pennsylvania State Univ., University Park.)

*16–20.* American Assoc. of Immunologists, Atlantic City, N.J. (F. S. Cheever, Graduate School of Public Health, Univ. of Pittsburgh, Pittsburgh 13, Pa.)

*16–20.* American Soc. of Biological Chemists, Atlantic City, N.J. (P. Handler, Dept. of Biochemistry, Duke Univ., Durham, N.C.)

*17–19.* Atomic Energy and Its Implications for Southern Industry, Atlanta, Ga. and Oak Ridge, Tenn. (O. H. Townsend, Atomic Industrial Forum, Inc., 260 Madison Ave., New York, N.Y.)

*18–19.* National Industrial Research Conf., Chicago, Ill. (J. J. Kowal, Armour Research Foundation, Illinois Inst. of Technology, 10 W. 35 St., Chicago, 16.)

*18–20.* American College of Allergists, 12th annual, New York, N.Y. (F. W. Wittich, 401 La Salle Bldg., Minneapolis 2, Minn.)

*18–20.* Conf. on Marine Corrosion and Fouling Problems, La Jolla, Calif. (Univ. of California Engineering Extension, Los Angeles 24.)

*19–21.* Assoc. of Southeastern Biologists, Durham, N.C. (J. C. Dickinson, Univ. of Florida, Gainesville.)

*19–21.* Ohio Acad. of Science, 65th annual, Springfield. (R. W. Dexter, Kent State Univ., Kent, Ohio.)

*20–21.* Arkansas Acad. of Science, annual, Arkadelphia. (L. F. Bailey, Dept. of Botany and Bacteriology, Univ. of Arkansas, Fayetteville.)

*20–21.* Biometric Soc., Eastern North American Region, Princeton, N.J. (A. M. Dutton, Univ. of Rochester, Box 287, Station 3, Rochester 20, N.Y.)

*20–21.* Iowa Acad. of Science, Grinnell. (J. L. Laffoon, Iowa State College, Ames.)

*20–21.* Nebraska Acad. of Science, 66th annual, Lincoln. (M. Beckmann, Univ. of Nebraska, Lincoln.)

*21–23.* West Virginia Acad. of Science, annual, Institute, W. Va. (M. Ward, Glenville State College, Glenville, W. Va.)

*22–26.* American Ceramic Soc., 58th annual, New York, N.Y. (C. S. Pearce, 4055 N. High St., Columbus 14, Ohio.)

*23–25.* American Oil Chemists' Soc., 47th annual spring, Houston, Tex. (W. Argue, Anderson Clayton Co., Houston.)

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*23–26.* American Assoc. of Petroleum Geologists, annual, Chicago, Ill. (R. H. Dott, Box 979, Tulsa, Okla.)

*23–26.* International Acad. of Proctology, 8th annual teaching seminar, Chicago, Ill. (IAP, 147–41 Sanford Ave., Flushing, N.Y.)

*24–25.* International Acad. of Pathology, 45th annual, Cincinnati, Ohio. (F. K. Mostofi, Armed Forces Inst. of Pathology, Washington 25.)

*24–27.* American Industrial Hygiene Assoc., annual, Philadelphia, Pa. (G. D. Clayton, 14125 Prevost, Detroit 27, Mich.)

*25–27.* Symposium on Nonlinear Circuit Analysis, II, 6th international, New York, N.Y. (Polytechnic Inst. of Brooklyn, Microwave Research Inst., 55 Johnson St., Brooklyn 1, N.Y.)

*26–28.* American Assoc. of Pathologists and Bacteriologists, Cincinnati, Ohio. (E. A. Gall, Cincinnati General Hospital, Cincinnati 2.)

*26–28.* American Physical Soc., Washington, D.C. (K. K. Darrow, APS, Columbia Univ., New York 27.)

*26–28.* British Columbia Acad. of Science, Vancouver, B.C., Canada. (W. J. Polglase, Dept. of Biochemistry, Univ. of British Columbia, Vancouver 8.)

*26–28.* Hawaiian Acad. of Science, 31st annual, Honolulu, T.H. (D. C. Cox, 1527 Keeaumoku St., Honolulu 14.)

*26–28.* Kansas Acad. of Science, annual, Winfield. (C. T. Rogerson, Dept. of Botany, Kansas State College, Manhattan.)

*26–29.* American Psychoanalytic Assoc., Chicago, Ill. (J. N. McVeigh, 36 W. 44 St., New York 36.)

*26–29.* Wilson Ornithological Soc., Buffalo, N.Y. (P. B. Street, Rt. 1, Chester Springs, Pa.)

*27–28.* Biometric Soc., ENAR, Chicago, Ill. (A. M. Dutton, Univ. of Rochester, Box 287, Station 3, Rochester 20, N.Y.)

*27–28.* Colorado-Wyoming Acad. of Science, annual, Golden, Colo. (O. W. Olsen, Colorado A & M College, Fort Collins.)

*27–28.* Mississippi Acad. of Sciences, Inc., Jackson. (C. Q. Sheely, Box 574, State College, Miss.)

*28–5.* International Conf. on Health Education, 3rd, Rome, Italy. (L. Viborel, International Union for Health Education of the Public, 92, rue Saint Denis, Paris, 1er, France.)

*29–3.* Semiconductor Symposium of Electrochemical Soc., 4th annual, San Francisco, Calif. (J. W. Faust, Jr., Westinghouse Research Laboratories, Beulah Rd., Pittsburgh 35, Pa.)

*29–3.* Southwestern and Rocky Mountain Div., AAAS, annual, Las Cruces, N.M. (F. E. E. Germann, Dept. of Chemistry, Univ. of Colorado, Boulder.)

*29–4.* Soc. of American Bacteriologists, annual, Houston, Tex. (J. H. Bailey, Sterling-Winthrop Research Inst., Rensselaer, N.Y.)

*29–4.* Soc. of Motion Picture and Television Engineers, 79th, New York, N.Y. (SMPTE, 55 W. 42 St., New York 36.)

*30–2.* American Geophysical Union, annual, Washington, D.C. (W. E. Smith, AGU, 1530 P St., NW, Washington 5.)

*30–3.* International Scientific Radio Union, spring meeting, Washington, D.C. (J. P. Hagen, 2101 Constitution Ave., NW, Washington 25.)

*30–4.* American Meteorological Soc., Washington, D.C. (K. C. Spengler, 3 Joy St., Boston 8, Mass.)

*30–4.* American Psychiatric Assoc., annual, Chicago, Ill. (D. Blain, APA, 1785 Massachusetts Ave., NW, Washington 6.)

**May**

*1–3.* Electronic Components Symposium, 7th annual, Washington, D.C. (A. W. Rogers, U.S. Army Signal Corps, Fort Monmouth, N.J.)

*3–5.* Illinois State Acad. of Science, annual, Springfield, Ill. (L. E. Bamber, 223 Natural History, Univ. of Illinois, Urbana.)

*3–5.* Midwestern Psychological Assoc., annual, St. Louis, Mo. (D. W. Fiske, Dept. of Psychology, Univ. of Chicago, Chicago 37, Ill.)

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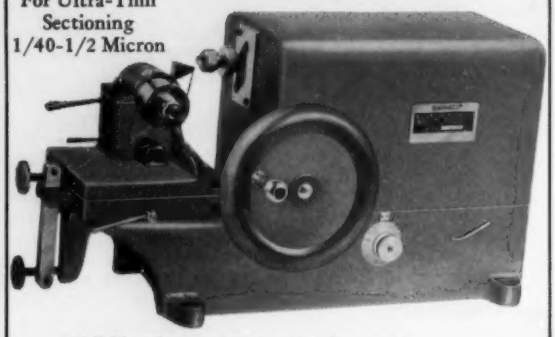

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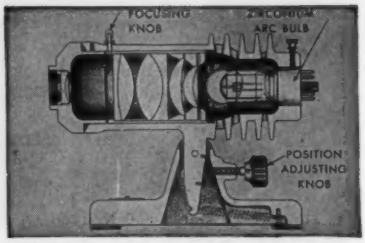


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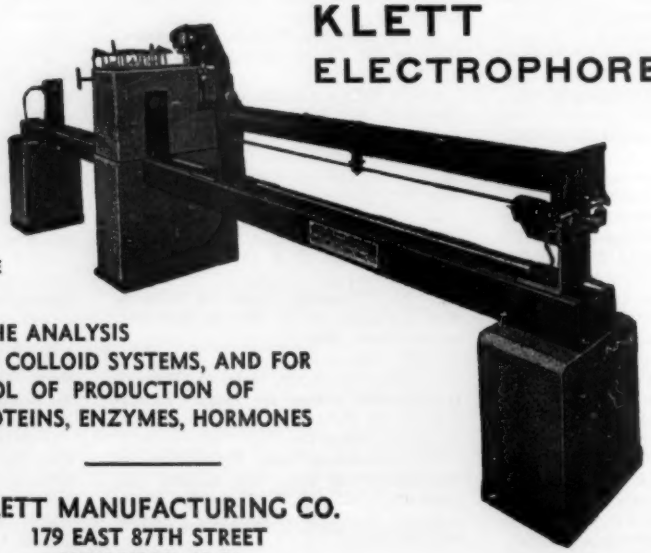

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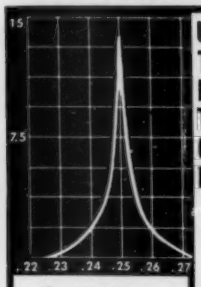


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■ SILICONE REFERENCE GUIDE for 1956 describes almost 150 of the most generally used silicone products, 18 of which were first introduced within the last 12 months. The products are grouped by physical form and cross-indexed by usage. (Dow Corning Corp., Dept. Sci., Midland, Mich.)

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■ PRIMARY MONOHYDRIC ALCOHOL, Abitol, is described in a new technical booklet that includes a discussion of the use of the product in alkyd resins, as well as a discussion of its properties and other general applications to adhesives, fixatives, hot-melt coatings, oil additives, wax additives, and surfactants. (Hercules Powder Co., Dept. Sci., Wilmington 99, Del.)

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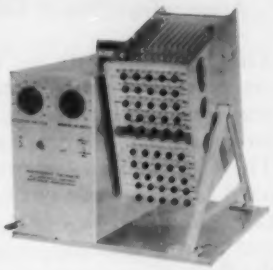

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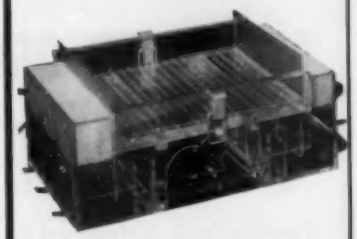

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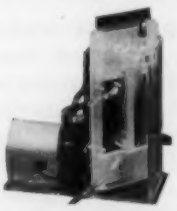

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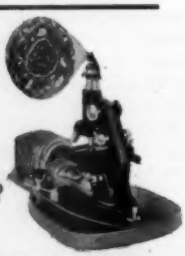

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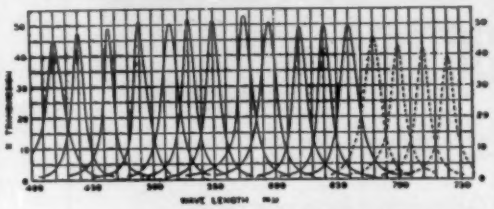

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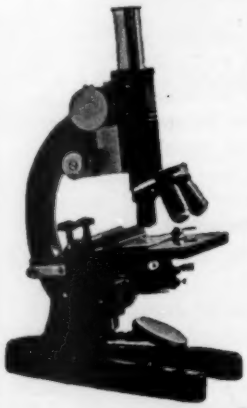

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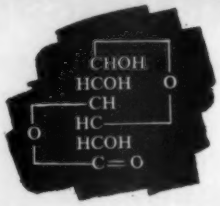


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A valuable source of protein nitrogen of exceptional purity for incorporation into diets to produce vitamin deficiencies.

MISCELLANEOUS BIOCHEMICALS

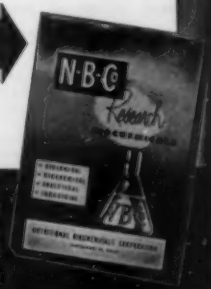
AMINO ACIDS
A complete selection of more than 100 amino acids.

"VITAMIN FREE" CASEIN HYDROLYSATE
Pre-tested for microbiological vitamin assays.

NUCLEOPROTEINS — PURINES PYRIMIDINES
A complete selection of all derivatives.

**WRITE FOR NEW CATALOG**

(February 1956)
**OVER 1500 ITEMS**
Write Dept. #102




NBC

**NUTRITIONAL BIOCHEMICALS CORPORATION**
21010 MILES AVENUE • CLEVELAND 28, OHIO

# PERSONNEL PLACEMENT

**CLASSIFIED:** 18¢ per word, minimum charge $3.60. Use of Box Number counts as 10 additional words.

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## POSITIONS WANTED

**Biologist, M.S.:** Endocrinology, biochemistry, aging-hormone relationships, trained in manometric techniques. Research experience. Desires biological research or teaching position. Box 33, SCIENCE. X

**Chemist, Ph.D.;** 3 years of teaching, 7 years as senior chemist and production superintendent in industry; 5 years as director of research, pharmaceutical company, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago. X

**Ph.D. organic chemistry.** Experience, 5 years of biochemical research. Publications. Also supervised clinical laboratory. Desires New York City area. Box 35, SCIENCE. X

## POSITIONS OPEN

**Biochemist** for laboratory that is doing research in hypersensitivity phenomena. Immunology not essential. Midwestern Medical School. Box 32, SCIENCE. 2/17

## POSITIONS OPEN

**Assistantships.** Research and teaching appointments in **Bacteriology.** Specialized research in virology, general, pathogenic, soil, food and dairy bacteriology. Write to the Department of Bacteriology, Oregon State College, Corvallis, Oregon, for information. 2/17, 24

**Biochemist, M.A. or Ph.D.** Competent to direct clinical chemistry laboratory in 560-bed hospital. Good salary, generous fringe benefits. Apply Personnel Director, Allentown Hospital, Allentown, Pennsylvania. 2/24

**Chief, Cardiopulmonary Physiology, Doctor of Medicine**

Extensive clinical and research facilities. Salary open. Write to Gardner Middlebrook, M.D., Research Director, National Jewish Hospital at Denver, 3800 E. Colfax Avenue, Denver 6, Colorado. 2/24

**(a) Clinical director;** physician interested in clinical pharmacology, capable executive; should be able to contribute ideas for new products, aid in their development, plan medical research for new drugs, serve on company's medical review board; East; $15,000. **(b) Biochemist** to head department, 22-man group established 1901; college town, Midwest. **(c) Biophysicist,** Ph.D. or one working toward doctorate; research department; large teaching hospital; Midwest. **(d) Physiologist,** Ph.D. or M.D., interested gastroenterology or another division of physiology; faculty position, medical school; East. **(e) Bacteriologist** qualified mycology or virology; research laboratories; Detroit. S2-3 Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago. X

## POSITIONS OPEN

**DOCTOR OF MEDICINE**

Direct activities of Biological Control of large Midwest ethical pharmaceutical manufacturer. M.D. degree required—in addition prefer Ph.D. or equivalent in a biological science. Should be young man under 40. Excellent opportunity for advancement in administrative responsibilities. Our employees know of this opening. Please send complete resume to Box 36, SCIENCE. 2/24; 3/2, 9

**PHYSICIANS WANTED**

Associate or assistant pathologist to Dr. David R. Meranze, Board certified or eligible. Major, general hospital, medical school affiliated; active teaching and research institution. Highly qualified staff. Albert Einstein Medical Center, Southern Division, Philadelphia 47, Pa. 2/3, 10, 17

**Physiologist;** recent Ph.D., with strong background in microbiology; to teach physiology at undergraduate level, lecture sections in elementary biology and to aid in expansion of graduate program in microbiology. Research opportunities; Arts college within eastern university. Box 34, SCIENCE. 2/24

## JOURNALS

**Polish Scientist** will be glad to enter into exchange relation with some American scientist or library and to send Polish scientific books or journals (some published in English) in exchange for American publications. Persons or institutions interested in this proposal are requested to send their address to Box 37, SCIENCE. X

# The Market Place

**BOOKS • SERVICES • SUPPLIES • EQUIPMENT**

**DISPLAY:** Rates listed below — no charge for Box Number. Monthly invoices will be sent on a charge account basis—provided that satisfactory credit is established.

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| Single insertion | $22.00 per inch |
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WANTED TO PURCHASE... **SCIENTIFIC PERIODICALS and BOOKS**

Sets and runs, foreign and domestic. Entire libraries and smaller collections wanted.

**WALTER J. JOHNSON, INC.**
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## BOOKS AND MAGAZINES

**Your sets and files of scientific journals**

are needed by our library and institutional customers. Please send us lists and description of periodical files you are willing to sell at high market prices. Write Dept. A3S, J. S. CANNER, Inc. Boston 19, Massachusetts

**SCIENTIFIC JOURNALS WANTED**

Sets, Runs and Volumes bought at top prices. Your wants supplied from our Back Files of over 3,000,000 periodicals. **Abrahams Magazine Service; N. Y. 3, N. Y.**

## PROFESSIONAL SERVICES

**LaWall & Harrisson** SINCE 1870
Div. S, 1921 Walnut St., Philadelphia 3, Pa.

**Food & Drug PROBLEMS**
**Pharmacological** BACTERIOLOGICAL CHEMICAL

## PROFESSIONAL SERVICES

WISCONSIN ALUMNI RESEARCH FOUNDATION

**LABORATORY SERVICES**

*Project research and consultation in Bio-chemistry, Chemistry, Bacteriology and Entomology*

Mineral determinations including sodium and fluorine • Proximate analyses • Vitamin and amino acid assays • Food chemistry and microbiology • Enzyme investigations

*Write for price schedule*

**WISCONSIN ALUMNI RESEARCH FOUNDATION**
P. O. BOX 2217-V MADISON 1, WIS.

**TRUESDAIL LABORATORIES, Inc.**

*Write for Brochure & Bi-monthly Publication "CHEMISTRY IN ACTION"*

4101 No. Figueroa St. • Los Angeles 65, Calif. CApitol 5-4148

CHEMISTS · BACTERIOLOGISTS · ENGINEERS

**Roger W. Truesdail, Ph.D., President**
**C. E. P. Jeffreys, Ph.D., Technical Director**

# The MARKET PLACE

BOOKS • SERVICES • SUPPLIES • EQUIPMENT

## PROFESSIONAL SERVICES

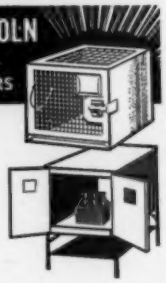
**BOOK MANUSCRIPTS INVITED**

Write for Free Booklet SC telling how we can publish your book. All subjects considered. New authors welcome.

**VANTAGE PRESS, Inc. • 120 W. 31 St., N. Y. 1**
*In Calif.: 6253 Hollywood Blvd., Hollywood 28*

## SUPPLIES AND EQUIPMENT

**AMERICAN-LINCOLN**
ANIMAL CAGES and INCUBATORS



• American-Lincoln animal cages of all types ranging from single units to large four compartment sizes. Special cages, spare pans, racks, etc., built to order. Incubators for egg embryo and container work used by America's leading scientific institutions.

Write for Catalog

**AMERICAN-LINCOLN INCUBATOR CO.**
New Brunswick, N. J. Dept. AS

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**CONSISTENT RATS & MICE**

**BUDD MT. RODENT FARM**
**CHESTER, N. J.**

*Breeders of a recognized strain of Wistar rats and W.S. mice*

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**GME**
714 MARKET PLACE
MADISON 3, WIS.

SEND FOR DETAILS ON THE NEW, ULTRA-COMPACT GME-LARDY WARBURG APPARATUS

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**FLANDERS RESEARCH FARMS • • •**

Breeders of

**WHITE SWISS** and **DBA/2 MICE**

Box 22A, Flanders, New Jersey
Phone Justice 4-7580

## SUPPLIES AND EQUIPMENT

Research Service
**PURIFICATION AND PHYSICO CHEMICAL MEASUREMENTS**
Thermal Properties • Vapor Pressure
Vapor Liquid Equilibrium • Solubility
Liquid Liquid Equilibrium
**APPLIED SCIENCE LABORATORIES, INC.**
140 N. Barnard St., State College, Pa. • AD 8-6282

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**ALBINO RATS**

Our mass production methods insure greatest uniformity and consistency

*Price list on request*

**DAN ROLFSMEYER CO. ■ Ph. 6-6149**
Route 3, Syene Road, Madison, Wisconsin

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**FINE THERMACOUPLES**
for biological and chemical applications—Made to your specifications, if desired.
*Inquiries on special problems invited*
**THERMALAB, INC.**
Box 84, Silver Spring, Maryland

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**STAINS—GURR'S—INDICATORS**
FREE PRICE LIST
**ESBE LABORATORY SUPPLIES**
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**YOU can TELL and SELL more than 33,500 scientists here . . . at a very low cost.**

Your sales message in an ad this size costs only $55.00 at the one-time rate—less for multiple insertions. And the results!—well, here's what one of the many satisfied advertisers in SCIENCE has to say . . .

"SCIENCE is consistently our most profitable medium. Business secured solely thru SCIENCE ads has been the backbone of our success in this field."

"We carry a considerable amount of advertising in various periodicals, but none is so productive of results as SCIENCE."

Prove to yourself the effectiveness of SCIENCE in increasing your Market, Sales and PROFITS—send your "Copy" NOW—or write for further information and Rate Card No. 29.

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## SUPPLIES AND EQUIPMENT

**SWISS MICE**

**TACONIC FARMS**
GERMANTOWN NEW YORK
GERMANTOWN 3535

*Send for booklet*

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**l(+) GLUTAMINE**
98% PURE
**G & W Laboratories, Inc.**
1-35 Ocean Ave., Jersey City, N.J.

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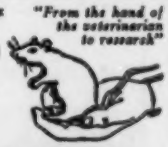
**albino rats***
Hypophysectomized Rats
**Descendants of the Sprague-Dawley and Wistar Strains*

*"From the hand of the veterinarian to research"*



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HENRY L. FOSTER, D.V.M.
President and Director
THE CHARLES RIVER BREEDING LABS.
Dept. B, Wilmington, Mass.

## HOLTZMAN RAT COMPANY

The superior uniformity of our rats manifests itself in mortality rates, general vigor, and in response to a given stimuli. This is the result of our rigid controls on environmental factors as well as genetic characteristics.

Rt. 4. Box 205 Madison 4, Wisc. Phone Alpine 6-5573

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**ANALYSIS OF AMINO ACIDS AND PROTEINS**

VITAMINS, MINERALS, FOODS, SPECIAL DETERMINATIONS

SHANKMAN LABORATORIES
2023 Santa Fe Ave., Los Angeles 21, Calif.

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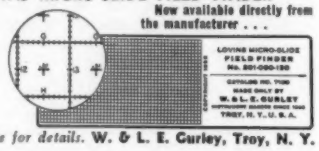
**LOVINS MICRO-SLIDE FIELD FINDER**

Now available directly from the manufacturer . . .



*Write for details.* W. & L. E. Gurley, Troy, N. Y.

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**RATS** Long-Evans (PAF) Wistar (PAF)

*Bred for Research Work by Research Workers*

PACIFIC ANIMAL FARMS
14516 So. Budlong Ave., Gardena, Calif.

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IMPORTANT IN

**HIGH VACUUM WORK**

**APIEZON®**

**OILS, GREASES, WAXES**

Apiezon products have the recognition of leading scientists who accord them top preference for high vacuum work. A bulletin just off the press describes the physical characteristics of a variety of special oils, greases and waxes for oil-diffusion pumps, sealing joints, stop cocks, etc. You should have a copy to augment your store of knowledge on the subject. Mailed free; simply ask for Bulletin 43-S.

JAMES G. BIDDLE CO.
*Electrical & Scientific Instruments*
1316 ARCH STREET, PHILADELPHIA 7, PA.

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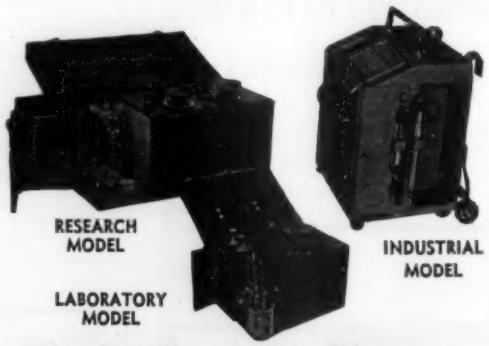



**Cambridge pH Meters**

The three portable models illustrated above incorporate new and important advantages. A.C. line operation eliminates battery nuisance. Laboratory and Research models use electron-ray tube for precise null-point indication. Industrial model is direct-reading, continuous-indicating; ruggedly built for plant use.

**Accuracy:** Research .02 pH, Laboratory .05 pH, Industrial .10 pH. Cambridge pH equipment also includes single- and multi-point indicators and recorders. Send for Bulletin 910-M.

CAMBRIDGE INSTRUMENT COMPANY, INC.
3525 GRAND CENTRAL TERMINAL, NEW YORK 17, N. Y.
*Pioneer Manufacturers of*
PRECISION INSTRUMENTS

A heating tape used on experimental copper counter-flow wing-packed column, running at elevated temperatures.

## A SAFE, ECONOMICAL, EFFICIENT SURFACE HEATER

# *Electrothermal*

# HEATING TAPES

Electrothermal Heating Tapes consist of one or more fabric bands of resistance wire, separated or bordered by bands of high-temperature-resisting glass fiber yarn. The width and length of the various tapes are carefully determined by the current carrying capacity of the resistance wire. Temperatures of 400°C and over can be reached inside a glass tube of 2mm wall thickness.

## *THREE TYPES AVAILABLE*

1. UNINSULATED—Current-carrying resistance wires are in direct contact with the surface to be heated. It is possible to look through this tape and it is of great value for research work when wound on a transparent surface.
2. INSULATED ON ONE SIDE—This tape is also applied with direct contact between the resistance wire and the surface to be heated . . . but heat losses to atmosphere are greatly reduced by the addition of a layer of knitted glass yarn on one side.
3. INSULATED ON BOTH SIDES—This tape is composed of two insulation layers with current-carrying bands in the center. May be safely wound on metal making it specially suitable for heating steel tubes, valves, nozzles and other conducting surfaces.

The tape is simply wound around the body to be heated, and is held in position by glass laces at both ends. A suitable control device such as a "Powerstat" or variable autotransformer should be used with the tapes.

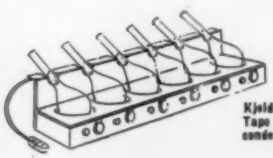
No. 55809—Powerstat, Variable Transformer, for controlling temperature of Heating Tapes. Has input of 115V, 50/60 cycles. Maximum output rating 7.5 amps. each $23.00

A FEW EXAMPLES of how Electrothermal Heating Tapes can be used:

Illustrating an application on cylindrical vessels.

Pipe line showing Heating Tape in position.

A Gas Bottle with Heating Tape in position.



Kjeldahl Unit with Heating Tape in position to prevent condensation inside necks of flasks.

| Length in Ft. | Width in Inches | Watts at 115 V | Amps. | Uninsulated Cat. #65080 | Insulated 1 side Cat. #65090 | Insulated both sides Cat. #65100 |
|---|---|---|---|---|---|---|
| 3 | 1 | 100 | 1.6 | $ 9.65 ea. | $11.40 ea. | $14.70 ea. |
| 4 | 2½ | 250 | 3.0 | 12.25 " | 14.90 " | 18.75 " |
| 5 | 3 | 450 | 4.6 | 16.65 " | 20.15 " | 26.45 " |
| 6 | 3½ | 500 | 5.2 | 19.25 " | 22.95 " | 29.40 " |
| 2 | ½ | 36 | 0.5 | | | 3.50 " |
| 4 | ½ | 72 | 1.0 | | | 5.50 " |
| 6 | ½ | 108 | 1.5 | | | 7.50 " |
| 8 | ½ | 144 | 2.0 | | | 12.00 " |
| 2 | 1 | 72 | 1.0 | | | 5.50 " |
| 4 | 1 | 144 | 2.0 | | | 8.50 " |
| 6 | 1 | 216 | 2.5 | | | 11.50 " |
| 8 | 1 | 288 | 3.0 | | | 15.00 " |
| 2 | 2 | 120 | 1.5 | | | 8.00 " |
| 4 | 2 | 240 | 3.0 | | | 13.00 " |
| 6 | 2 | 360 | 4.0 | | | 18.00 " |
| 8 | 2 | 480 | 5.0 | | | 30.00 " |
| 2 | 3½ | 210 | 2.5 | | | 12.00 " |
| 4 | 3½ | 420 | 4.2 | | | 19.00 " |
| 6 | 3½ | 630 | 7.5 | | | 26.00 " |
| 8 | 3½ | 840 | 10.0 | | | 45.00 " |

(Average Load of Heating Tapes is 2½ Watts/Sq. in.)

***Heat WHERE You Want It . . .***
***WHEN You Want It!***

***DEALERS' INQUIRIES INVITED***

LABORATORY APPARATUS
REAGENTS AND CHEMICALS

**STANDARD SCIENTIFIC** *Supply Corp.*

34 West 4th Street
New York 12, N. Y.

*Sigma Is Pleased To Offer*

# UNIDENTIFIED COMPOUNDS

*From Tissue and Yeast*

For years we have been working on the isolation of various compounds and concentrates. While our program is still far from complete it is sufficiently advanced to offer you a new tool of tremendous importance.

Since Sigma succeeded in purifying nucleotides to about 100%, numerous enzyme systems have ceased to respond, indicating the presence of trace impurities in the old grades. Now we have concentrated, and in some cases purified, these *impurities,* offering potent new reagents for further investigation.

A systematic approach to the selection of concentrates and compounds that might interest you is offered in a series of diagrams in process of preparation. Call us if interested.

**REAGENTS FOR THE DETERMINATION OF**

**— SERUM TRANSAMINASE**

in Myocardial Infarction and Liver Damage

**— SERUM PHOSPHATASE**

by the most rapid and accurate procedure known

**ASK FOR TECHNICAL BULLETINS #410 and #104**

***NEW OFFERINGS***

*90–100% pure* FAD
6-Phosphogluconate
6-Phosphogluconic Dehydrogenase
Yeast Enzyme Concentrate
*Soluble* Glucose-6-Phosphate, *Potassium*
*Soluble* Glucose-6-Phosphate, *Sodium*
*Soluble* Adenosine-5-Phosphate, *Sodium*

**WRITE FOR COMPLETE LIST — FALL 1955**

**SIGMA**
**CHEMICAL COMPANY**

4648 EASTON AVENUE, ST. LOUIS 13, MO., U. S. A.
*MANUFACTURERS OF THE FINEST BIOCHEMICALS AVAILABLE*